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THE IRON AGE

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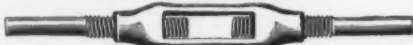
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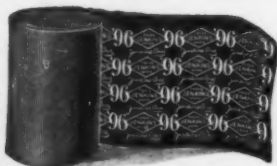
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THE IRON AGE

New York, Thursday, October 7, 1909.

THE VAN BUREN EXCAVATOR.

A machine for digging trenches, canals and railroad cuts which is the first of its kind, and is believed to be the largest of any kind for the purpose ever built, was recently shipped to North Africa by the Van Buren Engineering Company, New York City. Others of generally the same kind are to be built for use in this country, particularly in the Western States for excavating irrigation canals. The machine is the invention of the gen-

and is operated by a crew of three, an operator, a helper and a fireman. At a single passing of the machine a cut $6\frac{1}{2}$ ft. wide of any depth up to 5 ft. can be made. Wider and deeper cuts are made by successive passes of the machine. It is adapted for heavy dry excavating in almost any kind of material except, of course, solid rock. When an uncommonly large boulder is encountered which is too large for the machine to handle it must be

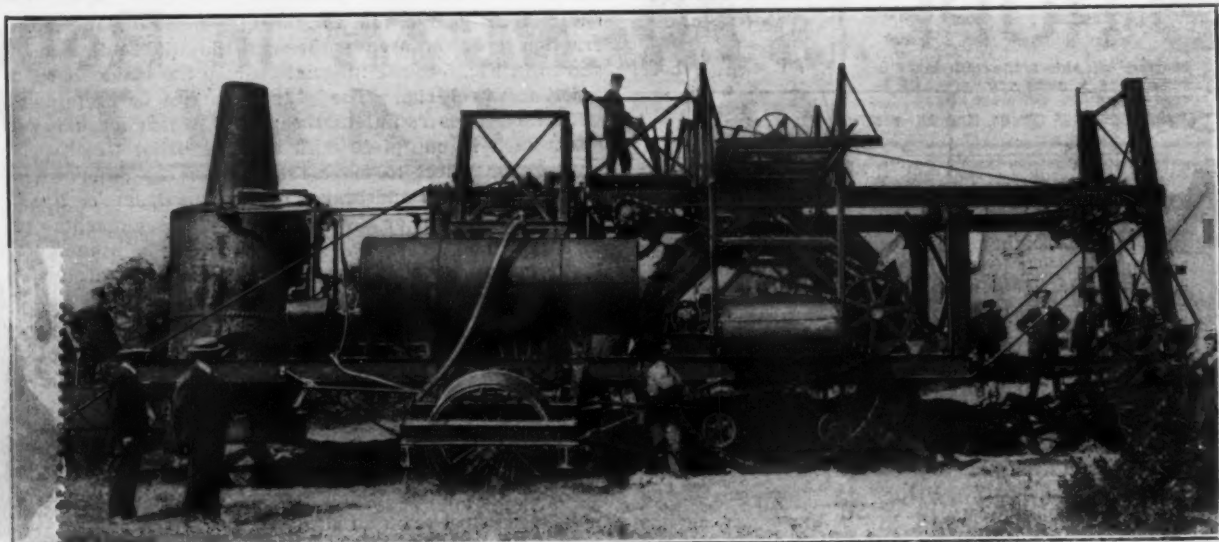


Fig. 1.

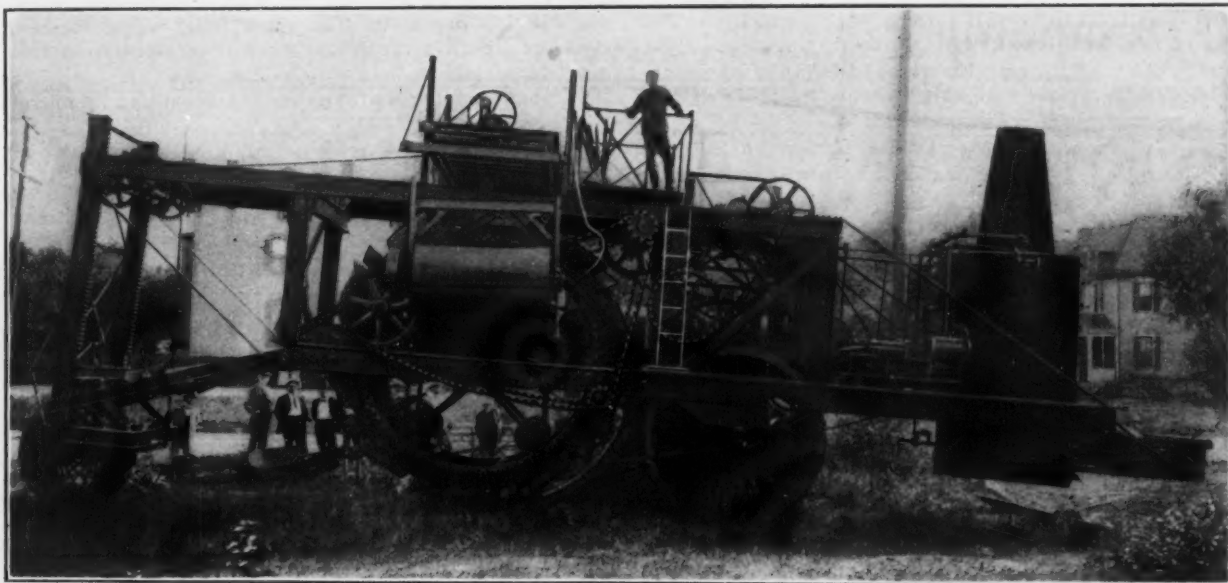


Fig. 2.

Views of Both Sides of the 78-In. Excavator Built by the Van Buren Engineering Company, New York City.

eral manager of the company, C. J. Van Buren, and was constructed from his designs and under his supervision by the Bergen Point Iron Works, Bayonne, N. J. Figs. 1, 2 and 3 are general views of the complete machine, and the remainder of the illustrations give details of its construction, and illustrate its manner of operation.

The machine is self-propelling and runs directly on the ground, that is, it does not require rails such as are used for a steam shovel. It is declared to have a capacity of about six times that of the largest steam shovel,

loosened or blasted, and unless the pieces are too large they can be removed from the trench by the machine. Excessively large boulders would otherwise have to be removed by block and tackle or similar means.

Briefly, the machine consists of a heavy frame carrying the cutting wheel, driving machinery and power plant, and supported by three wheels, two main traction wheels at the rear and a forward steering wheel. There is also carried at one side what is known as a leveling wheel, which is used to right the machine if it gets

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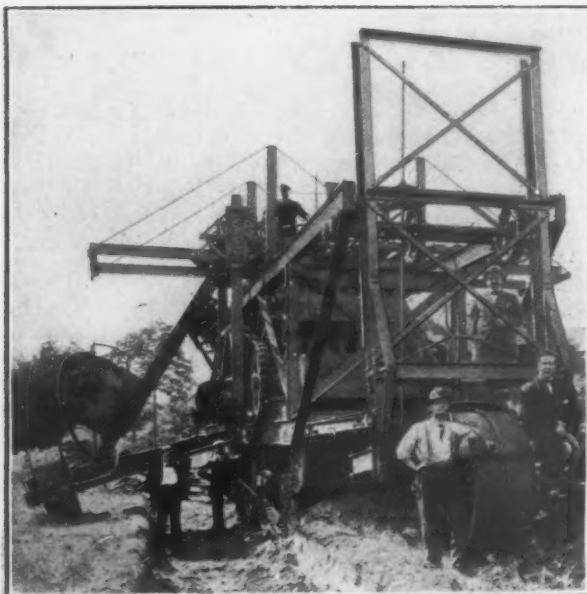


Fig. 3.—A Front End View of the Excavator.

slightly out of a perpendicular position. This wheel is supported at the outer end of an adjustable outrigger. One wheel suffices for keeping the machine in an upright position, as the weight of the outrigger with that of the water tank which it carries will hold the leveling wheel in contact with the side of the trench. Normally the raising gear is disengaged leaving the wheel free to follow the contour of the surface, but at the first evidence of tipping, as shown by an indicator on the operator's platform, a lever is thrown which causes the leveling wheel to be lifted or depressed, thus righting the machine.

The forward steering wheel has not only swiveling adjustment in a horizontal plane, but is arranged to be adjusted vertically with respect to the frame, which has the effect of regulating the depth of cut taken by the cutting wheel. The power plant comprises a 100-hp. vertical tubular boiler mounted at the rear of the frame, and directly in front of it a 78-hp. engine which provides all of the drive except that of the transverse conveyor in the center of the machine which is driven by a separate 12 hp. engine. The two main wheels are positively driven,

providing the forward movement of the machine, and the cutting wheel, revolving in the opposite direction, picks up the earth and deposits it on the transverse conveyor which passes through the center of the cutting wheel. Deposited on this conveyor the spoil is moved to one side or another and delivered to either cars or wagons, or on the ground at the side of the cut. All of the control of the machine is from the operator's platform at about the center of the machine.

The two main driving wheels are 8 ft. diameter by 2 ft. face and are shod with mud lugs and if necessary picks, such as are used on road rollers to prevent slipping on the ground. The wheels are driven at two speeds by the mechanism shown in Fig. 4, one being a relatively fast speed at which the machine is moved to position or transported from place to place, and the other the slower operating speed used when the cutting wheel is in action. Throughout the drive is by chains or gears; there are no belts on the machine. For the faster drive the power transmission is from the engine shaft to the gear *a*, and intermediate gear and the main traction gear *b*, thence through the differential gear shown in Fig. 5 to the internal gear on the inside of each traction wheel rim. The gear *b* carries bevel pinions with their axes radial to the gear *b* which mesh bevel gears each in one piece with a brake drum which permits either wheel to move faster than the other when turning curves. Band brakes around the drums *cc* Fig 5 enable holding one or the other to compel the machine to turn in a shorter space. Applying both simultaneously is the means of quickly stopping the machine's headway. For the slower speed the clutch *a* Fig 4 is thrown to engage an otherwise loose sprocket wheel *d*, the drive is then by chain to the clutch shaft *e*, thence through spur gears and another sprocket chain to the gear *f* which, through an intermediate, drives the main traction gear *b* as before, but at a slower speed. Simultaneously another chain drives the shaft *g* which carries sprockets at each end connected by a special 4½-in. manganese steel chain to the shaft *h* which carries pinions meshing with manganese steel teeth on each side of the cutting wheel.

As will be noticed the cutting wheel is without hub or spokes, and is guided in the frame by rollers which are disposed so as to take the weight of the machine when the wheel is in action. The upper roller serves to support the wheel in the frame when it is lifted from the ground.

From the clutch shaft power is transmitted by mitre

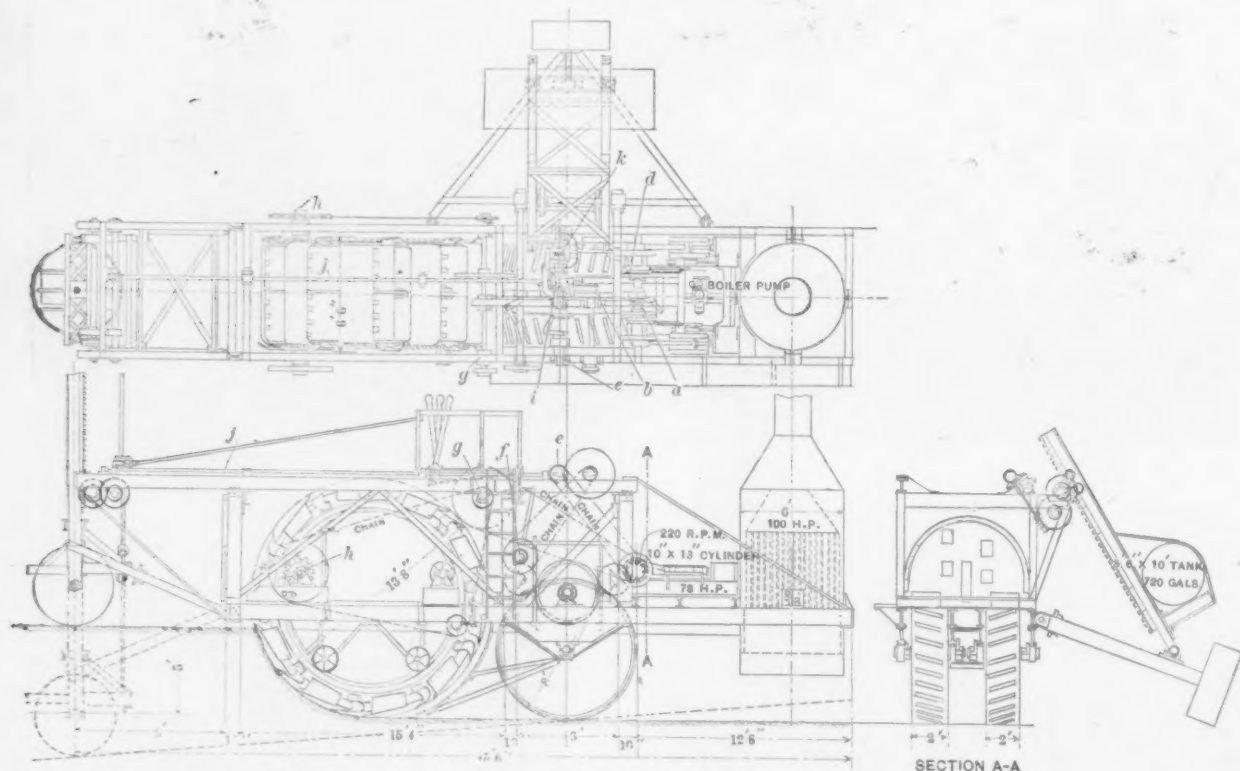


Fig. 4.—Plan and Side and End Elevations of the Van Buren Excavator.

gears *i* and a longitudinal shaft *j* to a set of gears at the forward end of the machine operating a pinion which engages the rack of the stanchions in which the forward steering wheel is mounted. A clutch on the shaft *e* sets this mechanism in operation in either direction, to raise or lower the forward steering wheel which correspondingly affects the depth of cut taken by the machine. From the same clutch shaft *e* through the clutch and set of mitre gears at *k*, power is transmitted through gears to a pinion engaging the rack on the leaf which raises and lowers the side leveling wheel.

So far all of the movements of the machine have been described except the steering of the forward wheel and the drive of the conveyor. The former is accomplished by hand through a hand wheel and shaft with universal joints driving by mitre gears a pinion engaging a circular rack circumscribing the steering wheel yoke.

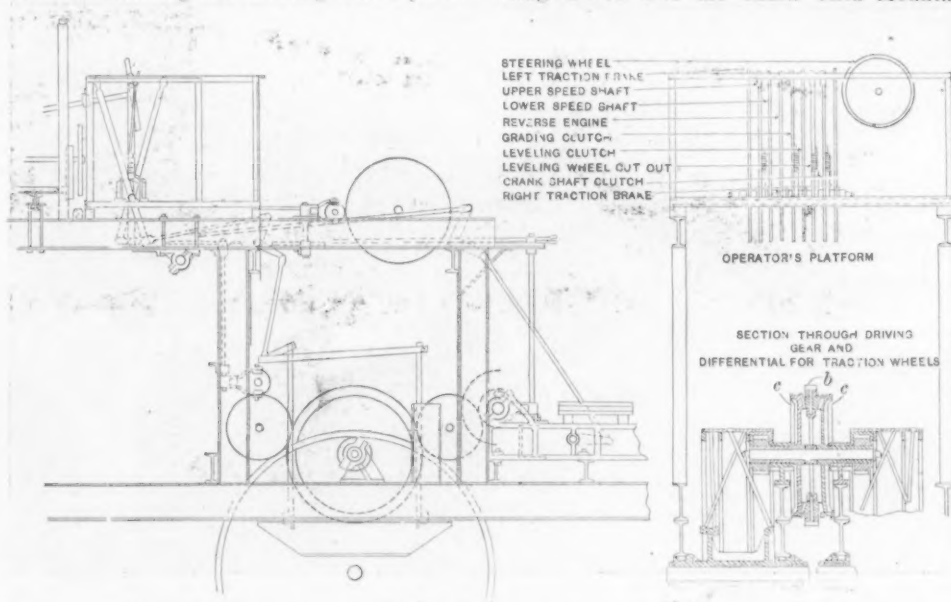


Fig. 5.—Details of the Drive of the Main Traction Wheels and Functions of the Operating Levers.

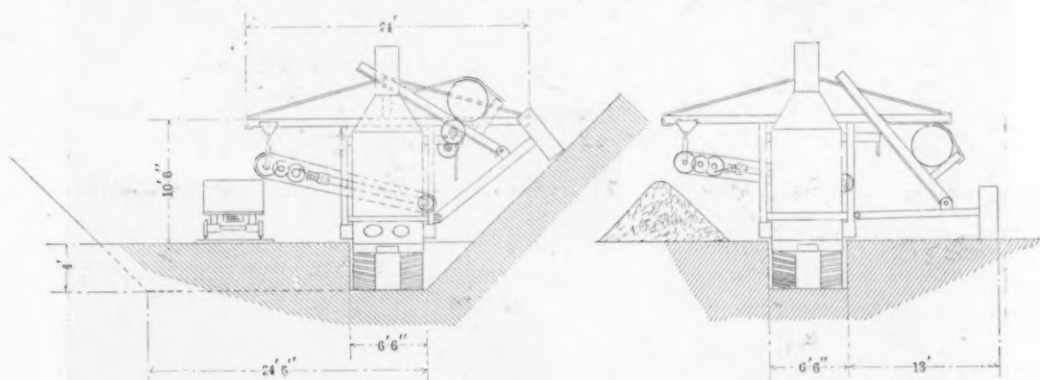


Fig. 6.—Diagrams Showing the Action of the Excavator in Two Kinds of Cuts.

The conveyor which handles the spoil from the excavator wheel clear of the machine, is driven by a separate engine as indicated in the diagrammatic view given in Fig 6.

It is unnecessary to the intent of the present description to go into the manner of connecting the controlling levers with all of the various movements. Figs. 4 and 5 show in a general way the connections to the clutches, brakes, &c. The function of the various levers are set forth in Fig 5.

The cutting wheel is 13 ft. 8 in. in diameter and carries the buckets or shovels which do the digging. The buckets, ten in number, are each the whole width of the wheel, and between them on each side are side flaring blades which increase the width of the cut sufficient to clear the driving gears on the cutting wheel. The buckets are armed with manganese steel points.

Exclusive of the coal box in the rear of the machine the overall length is 48 ft. The width of the frame is 7 ft., and the leveling wheel when in horizontal position

extends 12 ft. out to one side. The height from the ground to the level of the operator's platform is 14 ft. When taking its maximum depth of cut, 5 ft., the machine moves forward in ordinary soil at the rate of about 10 ft. a minute. When cutting to a depth of only 1 ft. the machine can be speeded up to as fast as 50 ft. per min., and for intermediate cutting depths intermediate speeds are used, the ratio being such that the capacity of the machine at any depth of cut is about 325 cu. ft. of material per minute. The machine weighs all told upward of 50 tons.

Among the many projects for the development of municipal water supply now in progress throughout the West involving notable engineering features is that of the city of Santa Barbara, Cal. It consists of a tunnel being driven into the Santa Ynez Mountains, about 2

miles distant from the city. It is intended ultimately to project this tunnel through these mountains and divert the Santa Ynez River through it, affording the city an abundance of water for all purposes. With the fall of about 900 ft. which will be secured, ample power will be afforded for the generation of electric current for power and lighting purposes, to utilize which the establishment of a power plant at some future time is contemplated.

The Republic Iron & Steel Company's plant at Toledo, Ohio, is soon to be put in operation. It has been idle since November, 1907. A large purchase of material has already been made. G. E. Stecher will be superintendent. He has been in the employ of the company for many years. Lafayette Young, formerly assistant superintendent of the plant at Moline, Ill., has been appointed assistant superintendent of the Toledo Works, and A. J. Jannette has been named as master mechanic. He removes to Toledo from Birmingham, Ala.

A NEW SWEDISH ORE VESSEL.

The Vollrath Tham, Which Carries Its Own Unloading Plant.

A new type of ore carrier, the Vollrath Tham, of the Lulea & Ofoten Steamship Company of Stockholm, Sweden, arrived recently at Philadelphia, Pa., on her maiden voyage across the Atlantic Ocean, with 7614 tons of Kirunavara iron ore, from Narvik, Norway, consigned to the Reading Iron Company, Reading, Pa. This vessel was designed particularly for carrying ore from Scandinavian to other ports which are without extensive facilities for unloading. Particularly of interest, there-

380 cu. ft. Five discharging hatches, each 12 x 32 ft., separate the ore hoppers. The ore hoppers are constructed of steel, braced on the outside with 10-in. beams, which also afford protection to the hopper walls while unloading. The bottom of the hoppers are of the inverted V type and do not extend the full depth of the hold, permitting of ready discharge of the ore at the bottom through suitable chutes.

At the loading ports the ore is discharged into the

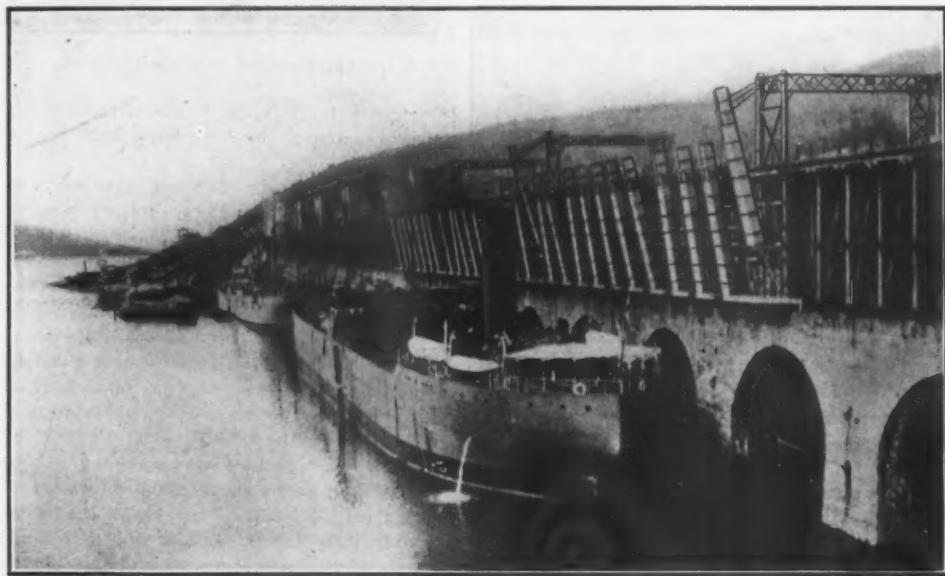


Fig. 1.—Stern View of the Vollrath Tham at the Loading Port, Narvik, Norway.

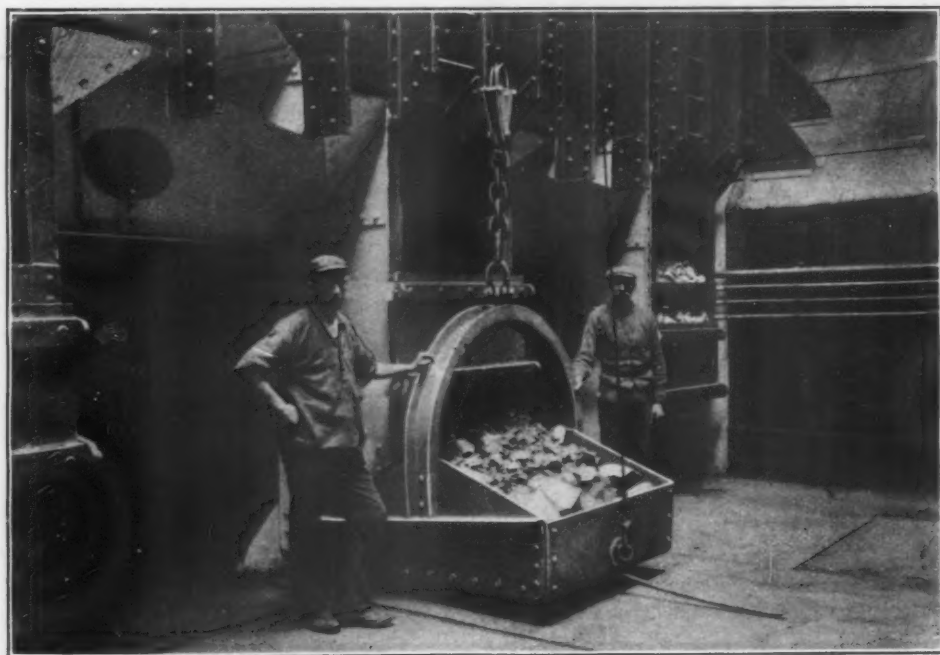


Fig. 2.—View Showing Discharging Hatches, Ore Bin and Chutes, and Ore Bucket at the Chute.

fore, are the unloading facilities provided on the vessel itself. This work is done by electric cranes operated by the vessel's crew. The Vollrath Tham was built by R. & W. Hawthorn Leslie & Co., Ltd., Newcastle-on-Tyne, England. It is of all steel construction, 376 ft. long between perpendiculars, 56½ ft. broad and has a depth of 33½ ft. It is driven by triple expansion engines of 2000 hp. and has a cargo capacity of 8400 tons. The cargo space is divided into seven hoppers or bins, three of which measure 24 x 32 ft. and four 12 x 32 ft., all approximately 30 ft. deep, giving a total capacity of 161,

bins, as shown in Fig. 1, by means of chutes, directly from the ore cars. An illustrated description of the steel ore dock at Narvik was given in *The Iron Age* January 9, 1908. At the unloading ports the ore is delivered through the discharge chutes, 3¼ ft. wide, of which there are four to each bin, into steel tubs or buckets, as shown in Fig. 2. These buckets are 4 ft. 4 in. by 5 ft. by 15 in. high, and each has a maximum capacity of 2½ tons. They are lifted by electric jib cranes, five on each side of the vessel, located on the deck and on the center lines of the discharging hatches, and are

swung over the side of the vessel and discharged as in Fig. 3. The cranes are of the built-up type, the length of the jibs being 20 ft. A complete circle can be swung with the cranes, operating on a roller bearing base, with watertight caps. The motors and drums for operating the cranes are located in separate hoist rooms, below the deck and directly under the cranes. A 5-hp. motor is used for the slewing, while a 20-hp. motor furnishes the hoisting power.

The manipulation of the crane is by a single lever, through controller boxes located on the platform of the crane, on which the operator stands and which extends over the hatchways, enabling the operator to have a full view of the operation of hoisting or lowering of the buckets. The latter operation is controlled by a foot

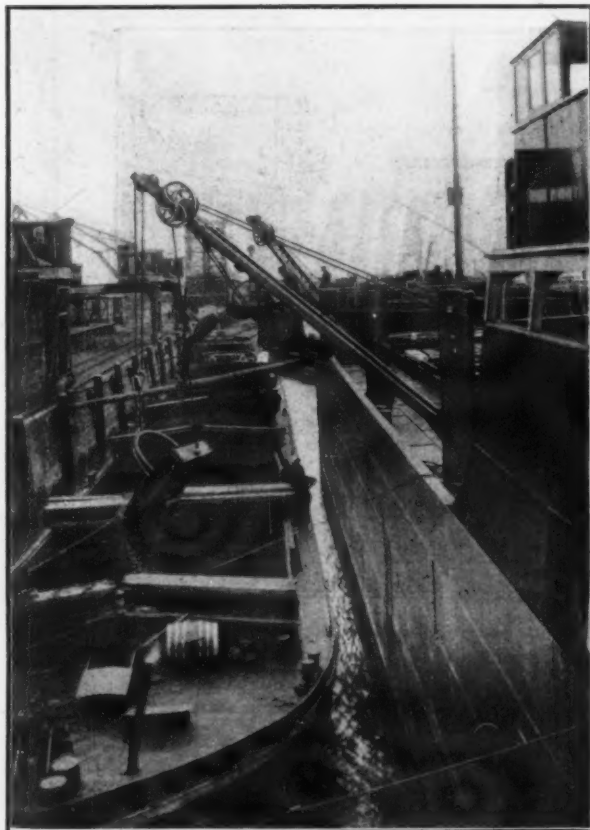


Fig. 3.—The Forward Port Electric Cranes Extending Outboard, Unloading Into a Lighter at Rotterdam.

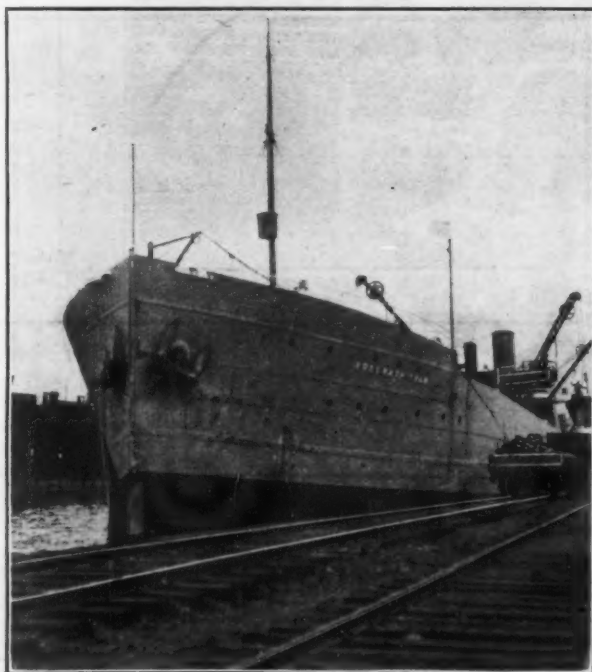


Fig. 4.—View of the Vollrath Tham at the Port Richmond Docks, Philadelphia, Pa.

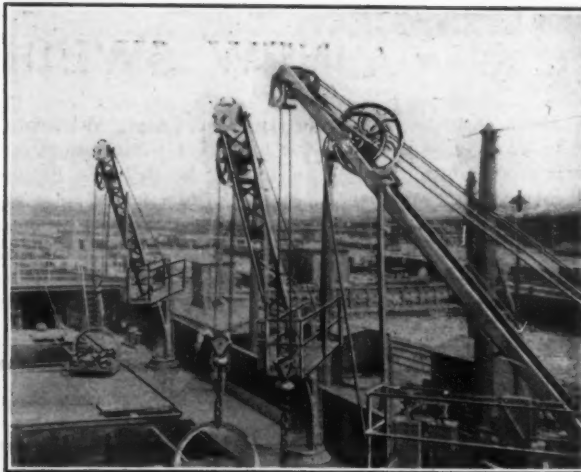


Fig. 5.—The Forward Port Electric Cranes Extending Inboard.

operated mechanical brake. Two 80-hp. Siemens generators supply the necessary current for the operation of the motors.

The buckets are of fixed type, and for convenience in moving have four rollers affixed to the bottom. The discharge of the buckets is controlled by a wire rope attached to the rear of the bucket, which passes over a drum and is held taught by a counterweight operating on small wheels, running up or down the inside of the crane jib. When the buckets have been lowered to the desired position this rope is held fixed by a hand brake operating on the drum, the bucket, then being slightly lowered, tips at an angle and permits of the complete discharge of the ore.

The operation of the gates on the discharge chutes at the bottom of the bins is extremely simple, but most effective. The main gate is 3 ft. 10 in. wide and approximately 18 in. high, strengthened by heavy flat bar ribs which also form the hinge joints holding them by four flat bars to hinge joints on the bins. One of the lower bars extends to a length of 7½ ft., is counterweighted and serves as a hand lever by which the gates are raised and lowered. This gate alone, as shown in Fig. 2, was found insufficient to make a clean shut off of the ore and a supplementary gate, in shape of an angle iron, 4 in. wide, was added at the bottom lip of the discharge chute and operated by a separate lever. The two gates, in conjunction, form a complete and perfect shut off, practically no ore whatever dropping after the bucket has been drawn away from the chute. The discharging capacity of the vessel is rated, from practical tests, at 4400 tons per 10-hour day. Twenty men are required for the operation, two to serve the buckets in each of the five discharging hatches and one each to operate the cranes. At the Port Richmond wharves, however, where the vessel was docked when the view given in Fig. 4 was taken, unloading was much slower, as it was possible to discharge from one side only. Under such circumstances one crane serves to unload from all of the discharge chutes in each unloading hatchway. No stevedores are required for the discharging of the cargo, the ore being dropped from the buckets either into lighters or into cars on tracks at the vessel's side. When out of service the cranes are swung inboard, as in Fig. 5, and in ordinary weather remain stationary. For safety, however, each pair of cranes is lashed together at the tops of the jib.

The Pullman Company, which is building large shops at Pullman, Ill., for the construction of steel passenger cars, has placed an order with the Allis-Chalmers Company, Milwaukee, Wis., for the power plant equipment, consisting of two steam turbines and generators aggregating 5,000 hp., with condensers, exciters, &c. auxiliary to them.

The Glacier Metal Company, Richmond, Va., expects shortly to manufacture a new fibrous metallic packing, under the title of Silver metallic packing, the special feature of which is its ability to stand superheat.

The Le Blond Heavy Duty Automobile Lathe.

Manufacturers having large quantities of duplicate lathe work have little use for numerous attachments on their machine tools. For this reason the R. K. Le Blond Machine Tool Company, Cincinnati, Ohio, is offering its new heavy duty lathes (illustrated and described in *The Iron Age*, September 2, 1909) in a simplified form known as the heavy duty automobile lathe. This tool is built in 16, 18 and 20 in. swing, the 20 in. size being shown in Fig. 1.

The headstock retains the same features as on the

casting as previously described. The lead screw and half nuts are left off. This apron may be furnished with automatic stops for the cross and longitudinal feeds, of a construction similar to that the company has been using on its high speed roughing lathes for several years.

Figs. 2 and 3 illustrate a special equipment of unusual interest applied to one of these lathes in the 20 in. size, and serve to illustrate the usefulness of this design for manufacturing purposes. The equipment is designed for turning the wrist pins on four-throw automobile crankshafts after the journals have been turned. It consists of a special chuck, tailstock fixture, double tool carriage with stops and an automatic stop mechanism on the apron.

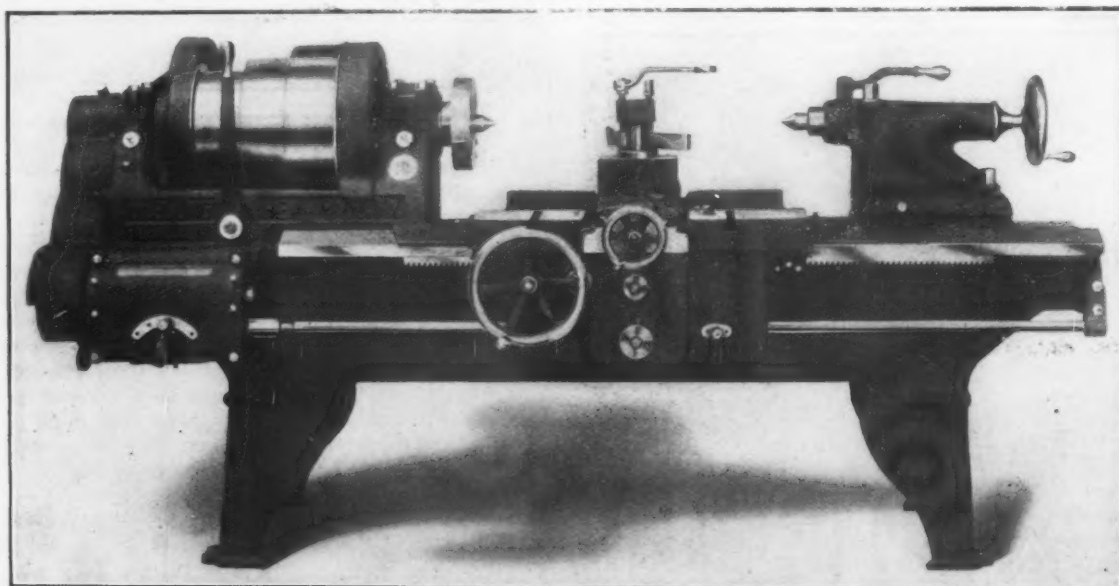


Fig. 1.—A 20-in. Heavy Duty Automobile Engine Lathe Built by the R. K. Le Blond Machine Tool Company, Cincinnati, Ohio.

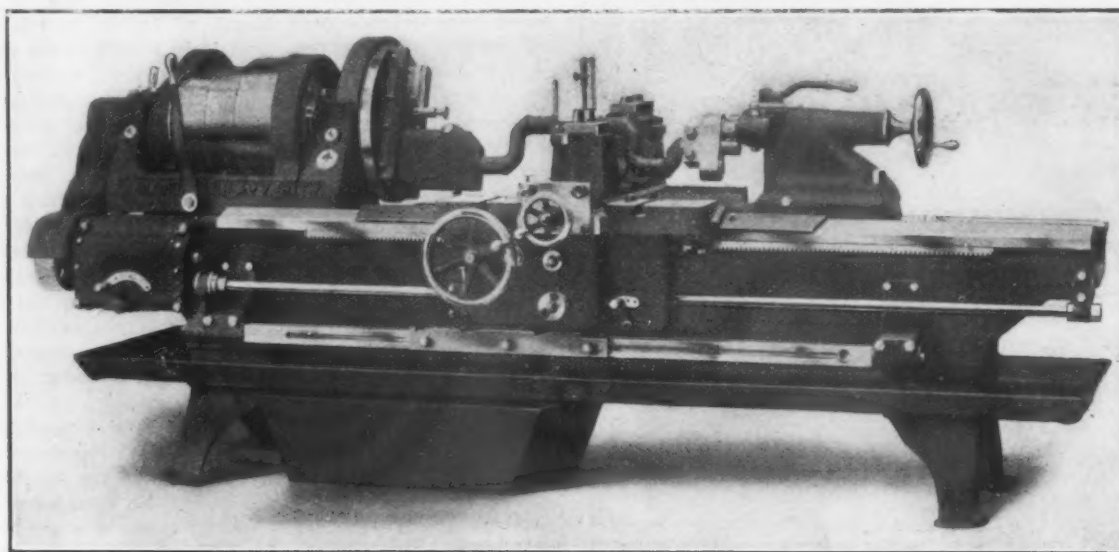


Fig. 2.—One of These Lathes Specially Equipped for Turning Crankshafts.

machine referred to, with the exception of the back gearing. Instead of the double friction back gear with its quick changes, which are so essential in a general purpose tool, the double back gears are engaged with a sliding key operated by the hand lever directly in front of the driving cone.

The usual quick change box is replaced by a four-change feed box. The changes are obtained by sliding gears operated by the crank handle shown on the front of the box, and may be made while the machine is in operation under the heaviest cut. These four changes are doubled by a reversible compound gear on the end of the bed which gives the operator a choice of eight geared feeds, covering a carefully selected range.

The apron is double walled of a single box section

The crankshaft is held in the chuck by one of the turned end journals in a split bearing, and is driven by the V shaped jaw which is screwed down on the first crank arm. This jaw pivots at its back end and is fitted with a helical spring under the clamping screw to facilitate chucking. This work-holding fixture is carried on a scraped slide on the face plate to which it is attached by a clamp and an adjustable gib. It is accurately positioned for the two crank centers by a hardened steel locking pin entering hardened steel bushings in the face plate, after which it may be securely locked in position by the two tee bolts. A counterweight is provided on the back of the face plate which is fitted with stops for its two positions, thus enabling the operator to counterbalance the crank in either position practically instan-

taneously. The other end of the crankshaft is clamped at the turned journal in a split bearing in the tailstock fixture. This fixture carries two hardened and ground bushings spaced the exact center distance of the crank throws, which are alternately used as journals on the special tail spindle.

The tailstock carries, immediately in front of the spindle, an auxiliary spindle which is spaced the same distance apart as the journals in the fixture. This auxiliary spindle may be readily withdrawn by the lever shown on the tailstock and serves a double purpose. In addition to affording a convenient means for changing the tail spindle from one bearing to the other it provides a means for accurately locating the tail fixture with relation to the crank throws when chucking. The alignment of the crank is readily accomplished by the auxiliary spindle just described and a locking pin shown directly under the crank (Fig. 3) which enters a bushing in the headstock.

The carriage is clearly shown in Fig. 3. The tool

block and expensive turret machinery usually installed for such work.

October Meetings of the Mechanical Engineers.

Meetings of the American Society of Mechanical Engineers are to be held during the month of October as follows:

In New York, on the evening of October 12, in the Engineering Societies Building, with a paper by Prof. R. C. Carpenter of Cornell University on "The High-Pressure Fire System of New York City."

In St. Louis, jointly with the Engineers' Club of St. Louis, on the evening of October 16, when Professor Carpenter will again present his paper upon the high-pressure fire system.

In Boston, on the evening of October 20, jointly with the Boston Society of Civil Engineers in Chipman Hall, a paper will be presented by Prof. Gaetano Lanza and Lawrence S. Smith on "Comparison of Results Obtained

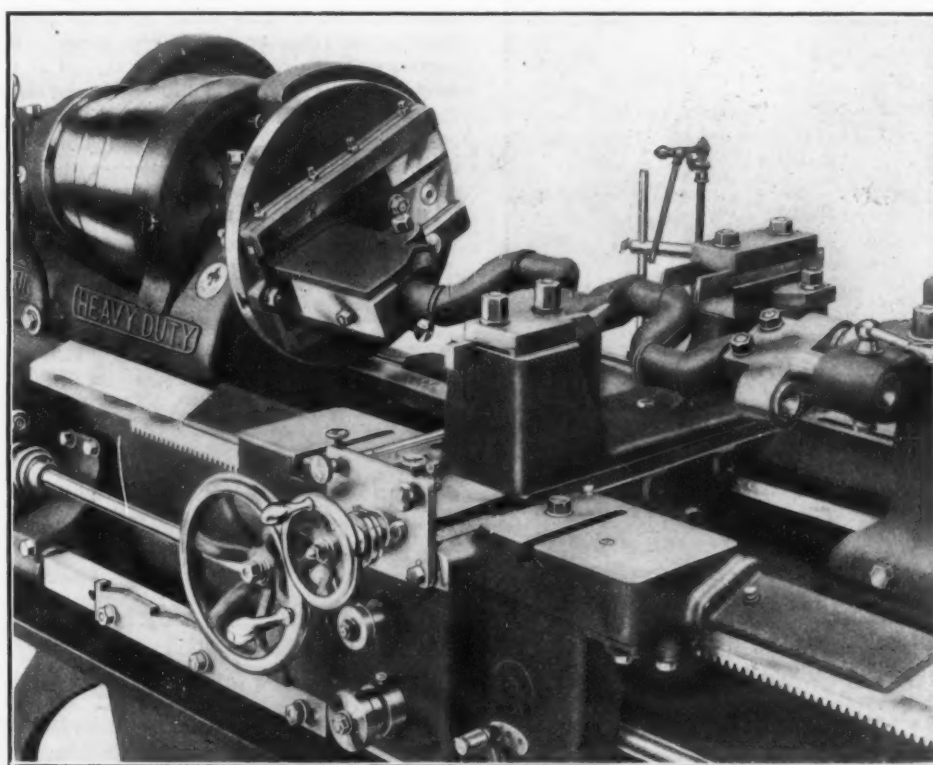


Fig. 3.—A Detail of the Work-Holding Fixtures and Carriage of the Specially Equipped Lathe

blocks are cast in one piece on a long slide which is mounted directly on the carriage. The rear tool block carries two tools, set the proper distance apart for turning out the fillets, while the front block carries a round nose tool for removing the stock between the fillets. The movement of these tools is controlled by the stops shown on the slide, which enables the operator to duplicate diameters.

The longitudinal feed of the apron is controlled by the multiple stop bar shown on the front of the bed in Fig. 3. The notches in this bar, which are spaced the same distance apart as the throws on the crank, engage a stop lever on the apron. In operation the carriage is run up against these stops, which brings the back tools into exact position for turning out the fillets. The carriage is then returned, the front tool run in and the automatic feed engaged. When the stop lever strikes the notch on the bar it operates a clutch on the feed rod and automatically throws out the feed.

For crankshaft work the stop bar is made as shown to reduce the setting up time. When this feature is applied to a regular automobile lathe the stops are made independent so that they may be set at any desired point within the range of the carriage travel. This construction affords a convenient method of turning shafts with a number of shoulders, and it is claimed that on many classes of work produces more work than the more com-

plex by the Use of Three Theories of the Distribution of the Stresses in Reinforced Concrete Beams," with the experimental results.

In conducting meetings in St. Louis and Boston the society is entering into broader activities than ever before and affording the membership a greater opportunity to attend meetings, participate in the discussion of papers and meet members and engineers in attendance at the meetings.

Ryerson & Son to Manufacture Machine Tools.—

It has been for some time quietly rumored in machinery circles that a Chicago concern had in contemplation the establishment of a plant for the manufacture of machine tools, which would form an important addition to this industry. It is now understood that Joseph T. Ryerson & Son are planning to enter this field and to this end are negotiating for a suitable plant site. Cincinnati is one of the points under consideration, and it is reported that the advantages of location in that city are being investigated with a view to the erection there of a large machine tool factory. The company is already well known as a manufacturer and distributor of boiler shop, railroad shop, fabricating and other iron working tools, and the carrying out of the plan suggested would make it an important factor in machine tools, especially of the heavy types required in railroad and other large shops.

General Electric Mill Motors.

Characteristic of steel mill machinery drives are exceedingly heavy momentary overloads, severe shocks and vibration, abnormally rapid acceleration, application of power at several points remote from one another, and certain operations that necessitate a reversal when running at full speed. Reliability of service is absolutely essential, as the various processes form a practically continuous train of operations and a breakdown stops the whole train. This condition makes it imperative that replacement of damaged parts be made in the shortest pos-

outline dimensions and are interchangeable for the same foundations. The standard alternating current motors, known as MI motors, are designed for 220 and 440 volt, three-phase, 25-cycle current, and are furnished in sizes of from 3 to 150 hp. inclusive. These motors are totally inclosed in horizontally split steel magnet frames of octagonal shape, the two halves being held together by a large bolt at each of the four corners. They are supported by four large feet, each foot drilled for one foundation bolt. Two hails are cast on the upper half of the frame for handling the motor. Each frame has a large opening over the collector which affords quick and easy access to the brushes and collector rings. There are other openings which provide additional facilities for inspecting the motor. All openings are fitted with malleable iron covers held in place by lock bolts so designed that the covers may be quickly removed.

The most noteworthy feature of this line of motors is the construction by which the stator winding is entirely separate from the frame, resembling in this respect the field coils of a direct current motor. This construction, together with a horizontally split frame, permits of replacing the rotor or stator very quickly and renders it necessary to keep in stock only spares of the parts most liable to damage. Fig. 1 illustrates the manner in which the upper half of the frame is removed and the rotor, stator and bearings lifted out as a unit for inspection or repairs. In making replacements it is not necessary to make any disconnections inside of the motor frame.

The construction is perhaps best shown in Fig. 2, where a slightly different type of motor is shown com-

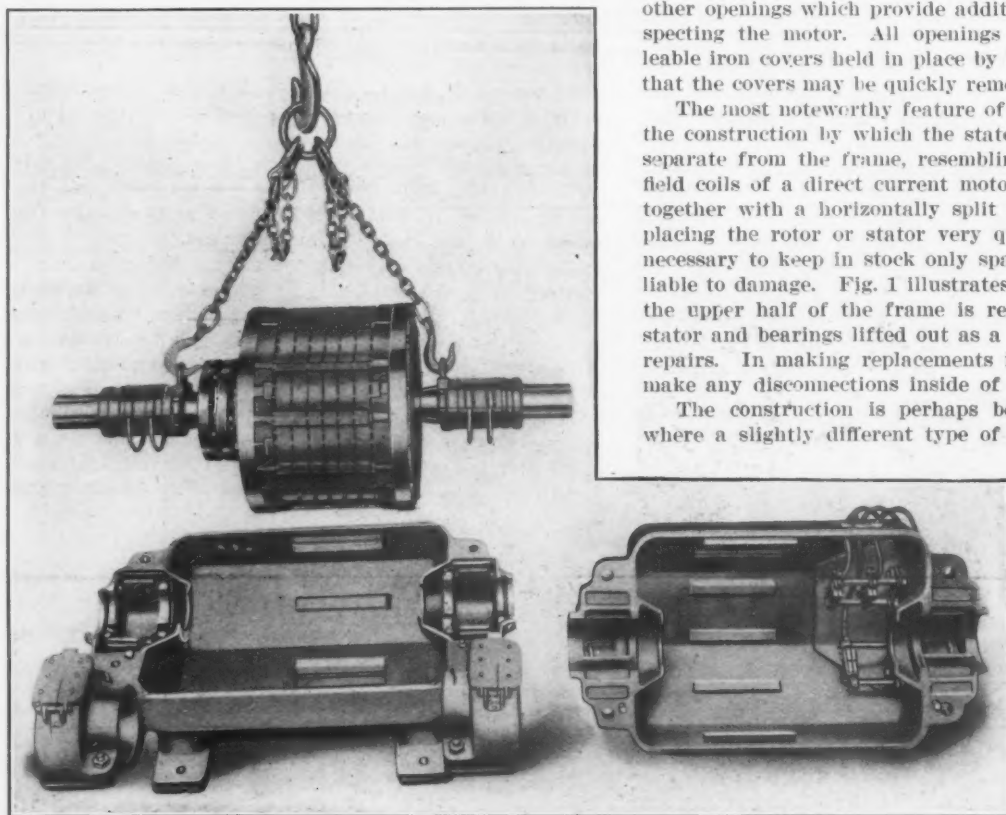


Fig. 1.—An M I Alternating Current Mill Motor Made by the General Electric Company, Schenectady, N. Y., Showing the Manner of Removing the Rotor and Stator from the Frame as a Unit.

sible time. The electric drive has several features which especially adapt it to mill work. Its advantages are, simplicity of power distribution, easy and rapid replacement of parts, low cost of inspection and maintenance, flexibility of controlling mechanism and adaptability to automatic control. It only remains to properly design motors, mechanically and electrically, to meet the severe nature of the power demands and to allow for the unfavorable conditions of high room temperature and dust laden atmosphere.

The General Electric Company, Schenectady, N. Y., manufactures a complete line of both alternating and direct current motors of especially rugged design for this most exacting class of service. The corresponding sizes of direct and alternating current machines have the same

pletely taken apart. The stator is in the form of a hollow cylinder and is a unit entirely separate from the frame. The punchings are assembled on steel studs which pass through end flanges by which the punchings are clamped tightly together. Each half of the frame has several ribs extending lengthwise which are bored to the diameter of the stator and are equal in length to the distance between its end flanges. When the stator is lowered into the frame and the upper half of the frame bolted on, these ribs automatically center it and prevent end motion. Rotation of the stator is prevented by ears projecting from the core. End flanges are provided and insure complete protection to the end windings and permit handling the apparatus freely without damaging the windings. The stator coils are form wound, molded to

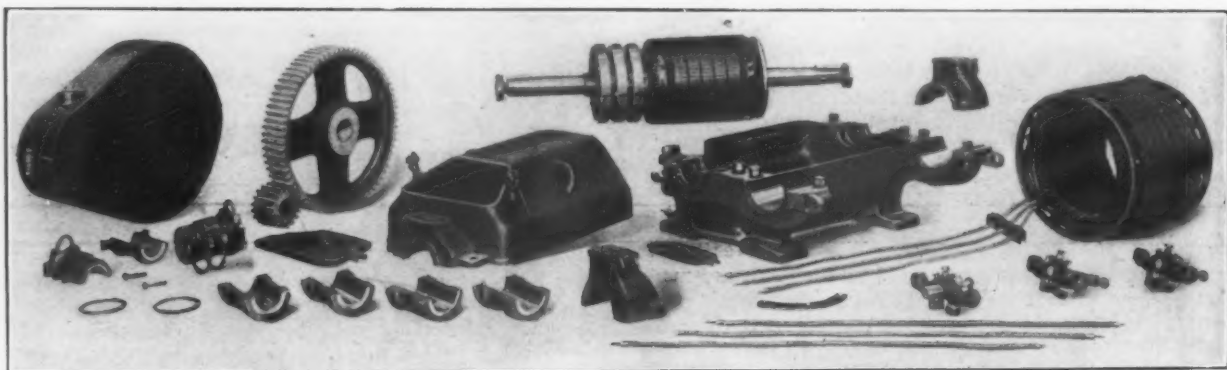


Fig. 2.—A Similar Motor Completely Unassembled.

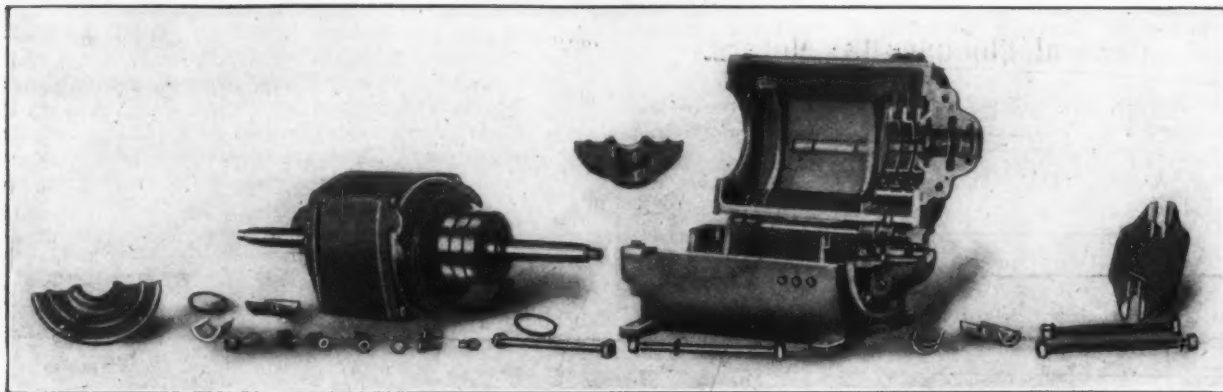


Fig. 3.—Modified Construction Adapting the Motor to Crane Use.

exact size and thoroughly insulated, and the completed coils are insulated with mica and woven asbestos. They are assembled in open slots and are held in place by non-combustible wedges. This construction makes it possible to replace a coil very easily and quickly.

The rotor is built up on a heavy spider, the punchings being assembled between end flanges keyed into place under heavy hydraulic pressure. The rotors are bar wound, in all sizes except the 3 and 7 hp., in partially inclosed slots. In order that reversal may be accomplished in the shortest possible time and with a minimum loss of energy while accelerating, the diameter of the rotor has been reduced to a minimum.

The collector spider is carried on an extension of the rotor spider to which it is keyed, making it unnecessary to disturb any connections to replace the shaft. The collector rings are bolted to this spider making their removal very simple. The rings are of exceptional size and the collector throughout is ruggedly built. The brush holder studs are of steel, are exceptionally large and are screwed to the frame. Heavy coiled phosphor bronze springs maintain practically uniform tension over their entire working range and permit a large amount of wear of the brushes.

The bearings are exceptionally large, affording ample bearing surface. The armature bearing housings are a part of the frame castings. The bearings are furnished for either oil ring lubrication or waste lubrication. To change from one form of lubrication to the other it is necessary to change only the upper half of the lining. The two halves of the lining are bolted together and a wrought iron bail is cast in the upper half, providing an easy means of handling the armature, as shown in Fig. 1. The armature end thrust is transmitted directly to the frame by a shoulder in the bearing lining.

The countershaft brackets are cast with the lower half of the frame and are heavily ribbed. The caps are bolted to the brackets. The linings for the smaller standard countershaft diameters are cast iron babitted, and for the large standard diameters are malleable iron babitted. The countershaft bearings are supplied for waste lubrication. Where motors are geared it is an advantage to use, where possible, a countershaft passing through brackets on the motor frame, to prevent the gear and pinion from springing apart under heavy loads.

The rotor shafts are exceptionally heavy and have pinion extensions at both ends. They can be replaced without disturbing connections. The pinions are of hammered steel and the gears of cast steel. The gear cases can be used at either end of the motor and are bolted to webs on the lower housing of the armature bearing and countershaft bracket.

In order to adapt this type of motor to crane service the 3, 7, 12 and 20 hp. motors have been designed to permit replacing the rotor in either of two ways. These machines have circular frame heads at both ends, the frame and frame heads being split. This construction admits of the removal of the rotor by removing the upper half of the frame and lifting it out or removing the head at either end and pulling the rotor out endwise. The heads may be shifted through an angle sufficient to permit mounting the motor on the wall or ceiling. In these sizes the upper half of the frame is hinged to the lower half, the hinge blocks being bolted to the frame to permit of

their removal if not desired. Fig. 3 shows the individual parts of these motors and brings out clearly the advantages in this design. This motor is designed for control by a rheostat in the stationary or rotor circuit. By this means partial speed control can be obtained and the motor can be started and accelerated at practically the same torque per ampere as at full speed.

MI motors have a maximum torque of approximately 250 per cent. of rated full load torque, and are designed to carry loads varying instantaneously from maximum in one direction to maximum in the other, with stresses far within the safe limit. They can be stalled momentarily without injury. Although these motors were designed primarily to meet steel mill conditions, they are equally adapted to any service in which the cycle of operation is short and the rate of acceleration and braking high, and where the equipment is subjected to rough handling and forced to its maximum output.

The Venice, Cal., High Pressure Salt Water System.

That metal conduits will resist, to a high degree, the supposed deleterious effects of contact with salt water was convincingly demonstrated in Venice, Cal., when an extension of a high pressure, salt water system for auxiliary fire protection, was made recently. The system, which was installed by the Abbot Kinney Company in July, 1905, was the first of its kind to be utilized on the Pacific Coast. It consisted of 12-ft. lengths of 8-in. cast iron mains, $\frac{3}{8}$ in. in thickness, weighing 54 lb. to the foot, to which were attached, at the usual intervals, cast iron laterals 6 and 4 in. in diameter. The system was fed by an intake pipe of $\frac{1}{2}$ -in. boiler steel, 3 ft. in diameter, laid in a foundation bed of concrete and projecting 200 ft. into the ocean, supported by concrete piles at the extremity beside the Venice pier. Bell and spigot, lead and oakum joints were used throughout, and a pressure of 60 lb. was used on the system, night and day, for more than four years. This was furnished by two underwriters' pumps having a total capacity of 750 gal. a minute.

As the location of the Venice resort is at sea level, no gradient was used in the laying of the mains and laterals, which extend throughout the beach town on a level beneath overlying sand varying from 3 to 6 and 8 ft. in depth. A maximum pressure of 250 lb. is possible on the system, and the streams thrown by the $1\frac{1}{4}$ -in. nozzles attached to the $2\frac{1}{2}$ -in. standard fire hose used, will readily go over the tops of the tallest buildings in the city, which are three stories in height. Although in constant use for more than four years, Fire Chief G. A. Hubbard of the Kinney Fire Department asserts that not one cent has been expended for repairs since the installation of the system. The high efficiency and low cost of upkeeping the system so impressed the city officials of a neighboring municipality that a month ago the Kinney mains were extended to include a mile and more of frontage along the ocean strand, at the expense of taxpayers. In making the necessary connections, no faults or flaws were found at any point, and the cast iron piping, joints and connections, under a careful scrutiny, appeared to be in as good condition as when first laid in place nearly five years ago.

A Large Bertsch Combined Multiple Punch and Squaring Shear.

A line of combined multiple punches and squaring shears has been added to the products of Bertsch & Co., Cambridge City, Ind. These will be built in all required sizes. The company now has patterns for ma-

punching, and Fig. 2 shows it with the punch crosshead lifted as when used simply for shearing. In Fig. 2 may be seen the vertical rods which serve as a hold down when the machine is used as a plain shear, and as a stripper when the machine is used as a combined shear and multiple punch. The number and location of these rods depend entirely upon the character of the work to be

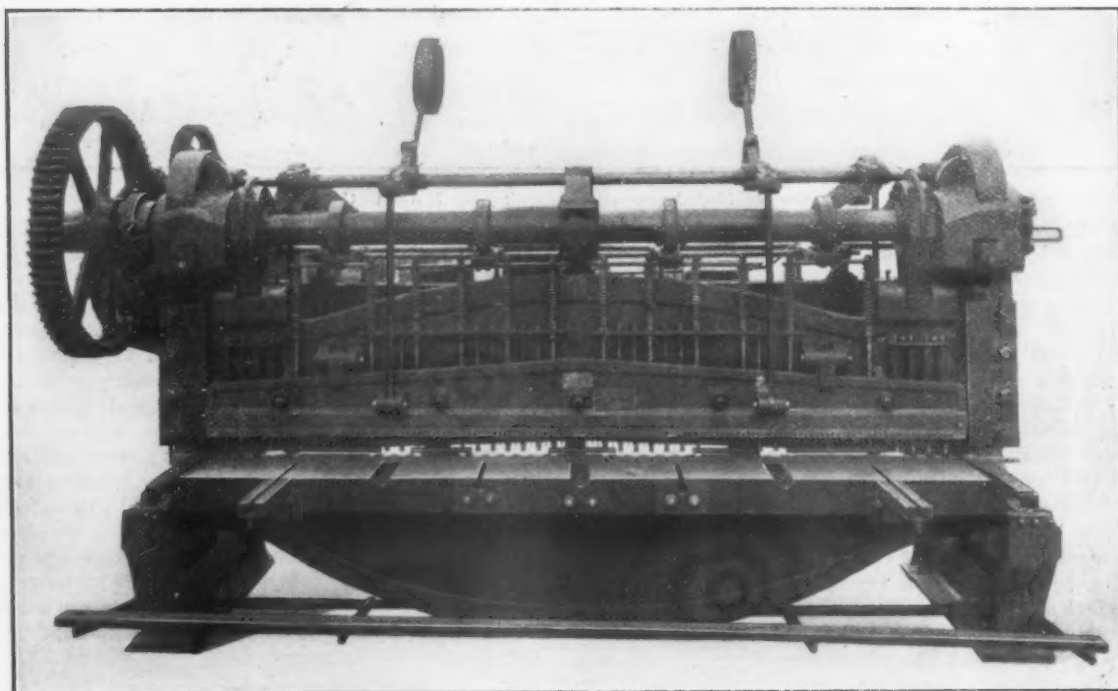


Fig. 1.—The No. 8 Multiple Punch and Squaring Shear Built by Bertsch & Co., Cambridge City, Ind.

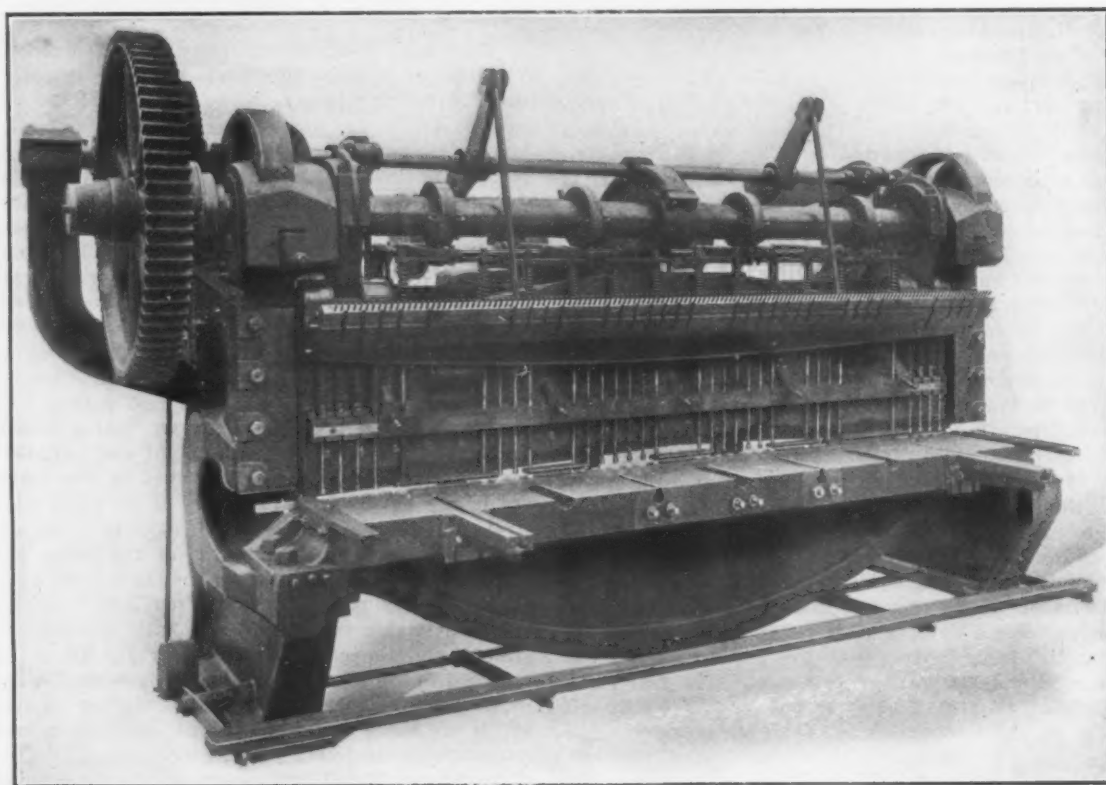


Fig. 2.—The Machine as Arranged for Shearing Without Punching.

chines ranging from 3 ft. to 12 ft. long, and varying in their capacity from the punching and cutting of No. 14 gauge sheets to $\frac{1}{2}$ -in. plates. The machines are built for either belt or motor drive.

The illustrations show one of the largest machines, known as the No. 8 shear, which weighs 50,000 lb. It has blades 144 in. long, and carries 144 punches. Fig. 1 shows the machine as arranged for both shearing and

done. They are actuated by a bar in the rear of the punch crosshead. For some kinds of work, a solid bar, the full length of the machine, is fastened to the ends of these rods. It is to be noticed in Fig. 2 that the cutting edge of the top blade is inclined from each end toward the center instead of from end to end. It is stated that this method has the advantage that it tends to keep the metal from drawing while being sheared. The smaller

sizes of the shear are made in the usual way, that is with the single shearing inclination instead of the double shearing bevel of the top blade.

When the machine is arranged as shown in Fig 1 it punches a series of holes simultaneously with a shearing stroke of the shear crosshead. It trims or slits and punches a series of holes in one operation. The distance from the center of the punches to the cutting edge of the blade varies from $\frac{1}{2}$ to 5 in. according to specifications. The punches have either universal or independent adjustment. For universal adjustment they are set in an adjustable dove-tailed steel punch holder bar, so that the entire lot can be removed or replaced together. When engaged the punch crosshead is securely locked and has a square shoulder fit along the entire length of the shear crosshead, against which all of the stress is taken, thus relieving the hinge pins of any strain. It also has end bearings.

When the punch crosshead is disengaged as in Fig. 2 the machine is converted into a regular gap shear. The punch crosshead is counterbalanced so that it is easily raised and lowered. It is only necessary to remove two stud nuts when disengaging or engaging the punch crosshead. By removing the top blade the machine can be used as a regular multiple punch, and a series of holes can be punched along any line in the sheet without shearing it. The shear crosshead has an end bearing against an adjustable brass glib.

All the machines in this line are built with the company's patented center bearing, and equipped with a clutch which is guaranteed to be reliable, positive, noiseless and easily operated. It has steel faced jaws, and a cast steel switch ring acting against a hardened steel roller on a verticle steel plunger. The main shaft bearings are adjustable split boxes. When specified these shears are built with front and rear brackets and gauges and drop leaf tables.

British Iron and Steel Imports Increase.

So far as statistics go, the figures for imports rather than exports of iron and steel reflect any improvement—and it is but slight—that has come to the British iron industry. Exports of iron and steel from Great Britain in August amounted to 351,417 gross tons, against 357,030 tons in August, 1908. The total for the first eight months of this year was 2,830,304 tons, as compared with 2,867,086 tons to September 1, 1908. Rail exports in August were 52,273 tons, against 48,069 tons in August, 1908. For the eight months rail exports were 400,081 tons, against 301,456 tons to September 1, 1908. More than half the increase was in exports to Argentina, while exports to British India and to Portuguese East Africa showed a considerable increase. The exports of galvanized sheets were 305,293 tons in the first eight months of this year, against 252,012 tons in the first eight months of 1908. Tin plate exports were 286,951 tons to September 1, this year, an increase of 16,000 tons over the same period last year. To the United States tin plate exports were 39,927 tons and 48,891 tons, respectively, in the eight months' periods of 1909 and 1908.

British imports of iron and steel amounted to 792,477 tons in the first eight months of this year, an increase of 89,000 tons over the figures for the corresponding period of last year. The most pronounced increase was in imports of blooms, billets and sheet bars, these being 363,082 tons to September 1 of this year, against 319,063 tons to September 1, 1908.

Driggs-Seabury Plant Improvements.—The Driggs-Seabury Ordnance Corporation, Sharon, Pa., has awarded a third contract for fabricated steel work to the Wm. B. Scaife & Sons Company, Pittsburgh. The latest order calls for a structural steel addition to the machine shop, 100 x 200 ft., which, when completed, will make that building 840 ft. long. Its width is 100 ft. Many new machine tools, such as lathes, milling machines, grinders, &c., have been ordered, and are to be installed at an early date. The new addition will increase the machine department about 40 per cent. The Driggs-Seabury

Ordnance Corporation has been executing large contracts for ordnance from the Government. It only has one more of these to fill, which will be done during the next month, and hereafter the greater part of its output will be automobile work, into which it has lately been going more and more extensively. It now manufactures pressed steel automobile frames, axles, transmissions, crank shafts, connecting rods, &c., for which it has a fair volume of business ahead. In the last six months the company has made extensions and improvements to its plant costing about \$200,000.

Cuba's Tariff Relations Under Discussion.

WASHINGTON, D. C. October 4, 1909.—Reports are current among the legations here that several foreign governments are preparing to demand for themselves the same tariff concessions from Cuba as are granted to the United States by the existing reciprocity treaty. These concessions embrace reductions in the rates of the Cuban tariff ranging from 20 to 40 per cent. Reciprocally, the United States grants a flat reduction of 20 per cent. on all Cuban products. This reciprocal concession has been of great benefit to the Cubans, who have been enabled thereby to market their sugar and tobacco in this country on very favorable terms. It is claimed, however, that American manufacturers and exporters have secured little advantage under the treaty and that the Cuban people have spent in European markets the money obtained from the sale of their sugar and tobacco in the United States. On this account efforts have been made from time to time to induce the State Department to abrogate the existing treaty, which can be done at any time on six months' notice, and to negotiate a new convention more advantageous to American commerce. It is believed that this would have been attempted by Mr. Root, when Secretary of State, but for the revolution which broke out in Cuba, making it necessary for the United States to take over the management of the government. Since the restoration of peace in the island the whole tariff problem has been under consideration in the American Congress and no steps have been taken looking to the negotiation of a new treaty. Section 3 of the Payne tariff law specifically provides that nothing therein contained shall be so construed as to abrogate or impair the existing treaty, or the provisions of the act of Congress passed for its execution, which leaves it in full force and removes it from the operation of the maximum and minimum sections.

Should any foreign government now demand from Cuba the concessions made to the United States by the existing treaty, the State Department would support the island government in a refusal on the ground that the relation of Cuba to the United States is similar to that of a dependency to the mother country. Such concessions are held to be exempted from the operation of the maximum and minimum provisions of the new tariff as found in section 3. Nevertheless, it is recognized that our position is by no means impregnable and that the contention as to the Cuban treaty is not altogether consistent with the maximum and minimum provision. Developments, therefore, will be awaited with much interest, not only for the effect of their possible bearing upon our relations with Cuba, but also for the effect they may have upon the general international tariff policy to be inaugurated when the maximum rates of the new tariff are applied to the goods of foreign countries denying to American products the advantage of their minimum duties.

State Department officials show no anxiety as to the course to be pursued by France and Germany when the minimum rates of the new United States tariff are withdrawn and the maximum duties substituted. It is expected that formal retaliation will follow the abrogation of the existing reciprocity treaties, as has already been foreshadowed in the notice given by France, but it is believed that in a short time a basis will be reached upon which the minimum rates of all the contracting powers will be mutually enjoyed.

W. L. C.

A TRIBUTE TO DAVID WILLIAMS.

An Expression From His Fellow Publishers of the Trade Press.

(With Supplement.)

On Tuesday evening, September 28, the third annual convention of the Federation of Trade Press Associations in the United States was brought to a close by a banquet in the Hotel Astor, New York. The retiring president of the federation, David Williams, was the guest of honor on this occasion. The guests numbered in the neighborhood of 90 and included, besides the delegates of the various newspaper associations to the convention, representative men in the iron, machinery and hardware industries, the postmaster of New York City and members of the staff of *The Iron Age*. Charles T. Root was the toastmaster and opened the speaking of the evening as follows:

Mr. Root's Address.

GENTLEMEN: This is my maiden appearance as presiding officer at any dinner larger or more important than the little family affairs of our own newspaper staff. However, I have attended a great many dinners and have observed with some care the presiding geniuses at the head of the table. Their actions have been so nearly uniform that I suspect the existence of a sort of International Amalgamated Toastmasters' Union. For example, I have always noticed that the toastmaster arises, raps for attention, and then begins to reel off all the good stories he has heard and crack all the merry quips which are obvious from the *personnel* and the occasion, and then, having cut out as much ground as possible from under the speakers, he proceeds to introduce them, bombarding each with eulogy or ridicule until the poor fellow wishes he were dead or never had been born. Having done his worst, he sits down and watches his victim spar for wind until he has partly recovered from the awful blow dealt him by his introduction. Now none of you need fear that I shall say any of your good things or make you squirm before you get upon your feet. The only advantage of my position which I am going to take is to speak before the rest of you.

I have had devolved upon me a most agreeable duty, which presently I shall endeavor to perform; but before doing so I ask the forbearance of the company while I indulge in a brief personal reminiscence. I came to New York just 34 years ago, my visible assets consisting of a young bride and about money enough to pay our board and care for a month. I came with the purpose of breaking into journalism in some form. My first engagement was as a representative in New York of a daily in another city. That did not last very long, because I found my interest speedily attracted to the trade field, which I shortly entered in a very modest way. My attention was soon riveted upon four bright particular stars in the trade firmament. They were the *Oil, Paint and Drug Reporter*, the *Shoe and Leather Reporter*, the *United States Economist and Dry Goods Reporter* and *The Iron Age*. These papers were the objects of my reverence and of my wild dreams, and I often said to myself that if I could ever rise to be the publisher of one of these papers my cup of pride and satisfaction would be full.

Within a half dozen years I became the publisher of the *Oil, Paint and Drug Reporter*. Another half dozen years and I became the publisher of the *United States Economist and Dry Goods Reporter*. Within 10 years more I published the *Shoe and Leather Reporter*. And a week ago to-day I was elected president of the David

Williams Company, becoming the publisher of *The Iron Age*. I venture on this personal reminiscence because it seems to me that it is not often given to men to realize thus specifically their particular ambitions.

The circumstances which rendered possible the final fulfillment of my early aspirations was the decision of David Williams, the builder and publisher of *The Iron Age*, to retire from the activities of the publishing side of his business and thereafter to devote such time as he might choose to give to affairs to his other important activities. Myself and certain associates sought the opportunity of taking over the publishing business of Mr. Williams, and our negotiations were finally successful. He was not at all precipitate, and I felt definitely complimented when he finally decided that we were suitable repositories for the important trust—which every influential newspaper should be held to be—and which he himself had administered for about a half century. So it comes about that almost simultaneously with his retirement from the presidency of this federation—the crowning honor within the gift of the trade paper fraternity—he relinquishes also his individual activities and responsibilities as a publisher.

Some of his friends have felt that this double event in the career of the Dean of the American trade press should not pass without some special recognition, and I have been deputed to give expression to that feeling. I do not find it easy to do this in just the fitting phrase, but this I can say, that after long observing Mr. Williams' business life all are unanimous in the opinion that his career furnishes us a model and an example, not merely for the degree of the success it has involved, but for the soundness and cleanness of the methods by which that success has been attained.

Some cynical publicist has written or said that no man can get together a million dollars honestly. David Williams is the living refutation of that pessimistic fallacy. He has gotten together a million dollars, and a good deal besides, and I would be sorry for any man who, in this company at any rate, would venture to intimate that there was one tainted dollar in his fortune. But this is an audience, fortunately, that has known our president and his work too well and too long to need any help in forming its opinions of it and of him.

Mr. Williams, some of your colleagues, who feel that in honoring you they honor themselves, have selected as a gift to you on this occasion yonder bit of bronze. Its title is "La Forge." It represents a primitive blacksmith and typical iron worker, and therefore presumably a denizen of the *iron age*. At all events, he appears to be a man as sturdy, as downright and as upright as yourself. Perhaps the little statue ought to have been made of iron; but bronze, they tell us, is even more enduring and so better typifies, we hope, your work and your renown. In the name of the donors I ask you to accept this as a token of the cordial good will and esteem that all your colleagues feel for you.

For myself and my immediate associates in the David Williams Company, may I be permitted to add that we, your successors, feel that if we shall be able to hold as high and as firmly as you have done the standards of accuracy, impartiality and unswerving independence which you have raised and maintained over the publications



DAVID WILLIAMS

Identified with THE IRON AGE since its foundation in 1855. Publisher and
Proprietor, 1868-1909. President of the Federation of Trade Press
Associations in the United States, 1908-1909.

we have inherited; if we can hold to the end of our administration the public confidence that you have won, and if we can at last retire from this field as you are now retiring, unassailed by enmity and unscathed by criticism, followed by the gratitude and affection of your employees and the respect of the trades with which your name has for so long been linked, with malice toward none, with charity for all—if we can follow in your footsteps to that extent, we shall certainly esteem ourselves among the most fortunate of our profession.

Finally, I cannot say that we regret your retirement from an increasingly difficult business. You have earned an honorable release and it is coming to you. But I will voice the sincere and universal hope that during a long future your life will be as calm, as fortunate and as happy as your past.

And so, David Williams, if we may borrow the classical toast of that beloved vagabond, Rip Van Winkle, "Here's your good health and your family's, and may they all live long and prosper."

Mr. Williams's Response.

At the close of Mr. Root's remarks the applause was so enthusiastic that it was some time before Mr. Williams, who rose to respond, was able to begin. He spoke as follows:

MR. TOASTMASTER AND GENTLEMEN: I have not words to thank you; and yet how inadequate would words be to express the thoughts they represent—much more the feelings, sentiments, memories and hopes that lie at the bottom of my heart. I thank you for this exquisite gift, which I shall always cherish, not only

for its beauty but also as a reminder of the donors with whom I have had so many years of friendly association. I thank you, too, for the kind and too flattering words which accompanied its presentation.

This is a memorable night to me. It marks the end of my career as a publisher, reaching back more than 50 years to the small beginning of what has since become a great journal—a business career longer than is given to most men to enjoy. It reminds me, too, that I am nearing the milestone marking the three score years and ten that are supposed to be the limit of man's active life.

It is no light thing to sever old associations and give up what has been one's life work, but it is the common

lot. Man, like the trees, has his growth, maturity and age; and a younger generation stands ever ready to carry on the work we have begun.

My life has been a long and prosperous and happy one. I was born at the time I would have chosen, at the commencement of the most wonderful era that has dawned upon this world, when the arts and sciences, which make the time we live in so different from all that have preceded it, were just beginning to make their influence felt. You young men can never appreciate how great this change has been. What were the wonders of a former time have become the commonplaces of to-day.

Try to imagine the condition of the arts and industry and commerce when I was born. The railroad was emerging from its experimental stage, and had solved its first problems. It already joined together places that were near, but only in the minds of men with the boldest imagination was there any anticipation of the state of things to-day, when the farthest corners of a continent are connected by bands of steel and its scattered communities have been made a homogeneous and united people. Steamboats plied on inland waters, but ventured little on the ocean, with whose waves they were ill fitted to contend, and gave little promise of the majestic structures of to-day, which force their imperious way in spite of wind and wave, with the regularity of the clock.

The steam engine, too, had reached the practical stage and had made an impression on the arts and industries. It was said to be doing man's work; but no one imag-

ined that it would, as is the case to-day, perform the task of giants, rivaling the fabled labors of Hercules. All that was known of electricity was the story of Franklin's kite and a few laboratory experiments, without a hint of telegraph or telephone, electric motors or electric light. Petroleum, with its countless derivatives, was not yet discovered. Gas was to be found in the larger places, but candles and whale oil lamps were still the common sources of light. Coal was used in small quantities within a short radius of the mines. There was no agricultural machinery; in fact, little machinery of any kind. Practically all the mechanical devices which we depend upon so much were lacking. Try to picture what life



The Bronze Statue, "La Forge," Bearing the Inscription, "Presented to David Williams, President of the Federation of Trade Press Associations in the United States, by His Fellow Publishers, September 28, 1909."

must be under such conditions and then try to imagine doing business in a city where there were no office buildings—to say nothing of skyscrapers—without stenographers, typewriters or even district messenger boys; when quill pens were still used, and black sand served instead of blotting paper.

To appreciate the present we must understand the past. And I am thankful that I have been able to watch the change from the old order to the new and in some small degree to aid in its development.

To what is this wonderful change due? To the sciences which underlie our industrial arts, which in their turn depend on technical literature. So it all comes down to the printing press. Students of history choose different events as marking the turning or dividing point between the ancient or medieval and the modern world. For me there can be but one—the discovery of printing. Before that, men were as strong and brave, endowed with minds as keen, imagination as vivid, as to-day. With all our boasted progress we still look for the masterpieces of art and architecture, of poetry, philosophy and history to ancient Greece and Rome. But when we look for what we call science, what do we find? Nothing worthy the name. Astronomy almost down to our day was a system of pretty dreams; chemistry, a mixture of alchemy, magic and the search for the philosopher's stone; medicine, a barbarous collection of superstition and grotesque remedies. Before the printing pressmen did as well as we, all that an individual man might do by his own proper powers, but it was all individual work. No one could reap the results of other men's work as now. With the invention of printing what a change! The printed book went at once to all the centers of learning, the universities and libraries, as well as to private scholars. It was subjected to the simultaneous criticism of the whole world, its facts discussed, its theories weighed; and so, gradually a body of truth grew until at last, and not so long ago, the practical sciences which are the basis of our industrial arts took form. This has been a process of evolution, and it is hard to conceive how slow it has been and how great a mass of books has been required. A few years ago a certain professor tried to induce the Engineers' Club to undertake the collection of a library of engineering books. I asked him once how much room such a library would require. He said he thought the clubhouse could contain them if books on chemistry were not included; that if they were, as much more room would be needed. The clubhouse was four stories and basement, 27½ ft. front and probably 70 ft. deep. This immense mass of books were practically all dead. They were the ore from which the truth had been refined. They were as the countless generations required in the evolution of a new type of life.

At last the pace of invention, discovery and scientific progress grew so rapid that the book became too slow. It is a lucky book that lives ten years: some are outgrown in two; and I have known a book to be obsolete before it was printed. Hence the technical periodical which keeps its readers informed of the developments in its special field. No one expects the general newspaper to deal intelligently or adequately with any technical subject. It will flash the news of a discovery or happening all around the world if it be deemed of popular interest, but all who desire more than a superficial account must wait for the technical journal which will treat the subject fully, intelligently and fairly.

The Good Book tells us the Creator gave our first parents two commands. In one he forbade them to do something which they immediately did. In the other he

commanded them to subdue the earth. How little of that subjugation was accomplished during the long ages that preceded the invention of printing, less than 500 years ago! How much has been accomplished during the few years that have elapsed since then, and how rapid has been the progress since the technical journal came upon the scene!

You, gentlemen, technical and trade journalists, are the vanguard of the procession which is marching toward the fulfillment of that command of God. You are the forerunners of the time when man, having subdued the forces of nature, shall make them do his work, and with the fulfillment of the command shall escape from the curse. "In the sweat of thy face shalt thou eat bread."

That all your journals may continue to grow and prosper and that you may live long in health and happiness is the earnest wish of him who was your Dean.

Mr. Williams's speech was received with the heartiest and most gratifying demonstrations of respect and friendly feeling on the part of all present.

A humorous song, by an author as yet undisclosed, and referring quite pointedly to Mr. Williams and his successor, was sung by the whole audience to the tune of "The Good Old Summertime" amid general hilarity, and then the speaking was resumed. Mr. Williams was followed by Postmaster Morgan, Hon. Chas. F. Moore, Chas. Kirchhoff, R. R. Williams and others, and the banquet was closed by the singing of the chorus of "Auld Lang Syne."

The gift to Mr. Williams from his fellow publishers is represented on another page. The whole evening was absorbed in the desire of the convention to do honor to Mr. Williams, and the occasion was voted the most successful in the history of the Federation.

Chapman Valves.—The Chapman Valve Mfg. Company, Springfield, Mass., announces that its new management will continue to have a corps of efficient workers. Adolph W. Gilbert, whose name for 12 years has stood in the valve world for honor and honesty, good management and good goods, is the new president and general manager. Robert Shirley, a most capable designer and engineer in the valve business, is works manager and engineer. He has designed the largest valves ever made, weighing 126,000 lb., and with a 9-ft. opening. The company has also secured the services of Edwards O. Davis and John Busch, equally as favorably known and as capable in their respective departments of valve making. The department of assembling and testing of valves and hydrants has been made independent of all other departments of the factory and placed in charge of a capable man, who is responsible only to the president and general manager, thus insuring a close, independent inspection of material and workmanship before assembling. This is a policy that Mr. Gilbert has pursued successfully for eight years and will be appreciated by all who understand conditions in valve shops.

At the recent bimonthly meeting of the mechanical section of the Engineers' Society of Western Pennsylvania, held in its quarters in the Fulton Building, Pittsburgh, T. H. McGraw, Jr., Pittsburgh representative of the Erie City Iron Works, read a paper on "A New Type of Water Tube Boiler." Lantern slides were used to illustrate the boiler and its construction. An illustrated description of the Erie City vertical water tube boiler appeared in *The Iron Age* of August 19.

The Warner & Swasey Company, Cleveland, Ohio, is building a large addition to its new plant. The buildings are of single story, steel and concrete construction, and equipped with electric cranes and other modern features. The addition is to be completed by December 1.

A New Ferracute Double-Crank Toggle Drawing Press.

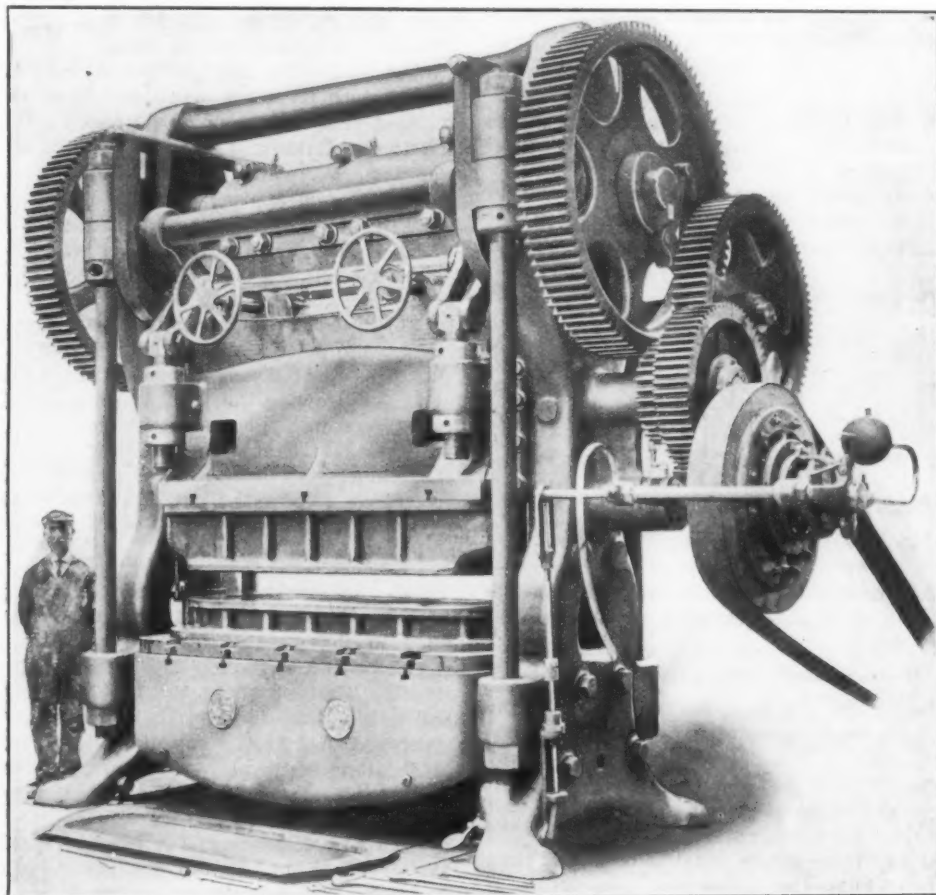
Presses for drawing seamless sheet metal shells are usually constructed with an outer ram or blank holder and inner ram or plunger, making them double acting as distinguished from single acting presses that have but one ram. The outer ram may be driven down and held by various mechanical devices, a method much in vogue being by cams on the main shaft. For certain shapes and sizes, heavy springs may be used. What is considered a better and more modern device is an adaptation of the toggle or knee joint principle which enables the pressure between the blank holding surfaces of the dies to be taken by the frame, thereby obviating the loss of power that occurs from friction when this pressure is sustained by the main shaft.

The press illustrated is a recent production of the Ferracute Machine Company, Bridgeton, New Jersey.

ing them to revolve in the same direction when one is turned.

Attached to the plunger are two yokes, one on each side of the press. These yokes have a vertical motion of 15 in., the same as the plunger. Rollers on the extensions of the middle toggle pins are guided in slots in these yokes, the toggles being thereby straightened out at each stroke. The upper ends of the toggles are attached to the columns and the lower ends to the outer ram.

The press is triple geared, all gears are cut, and the ratio of the gearing is 75 to 1. The steel back shaft is of unusually large diameter and the main shaft carries large gears of equal size at each end which relieves the shaft from torsional stress. These gears are 5 ft. diameter and 10 in. face. The fly wheel is 40 in. diameter and 7 in. face and runs at a speed of 500 rev. per min., which gives from 6 to 7 strokes of the press per minute. The ram may be stopped at any part of its



A New Heavy Double Crank Toggle Drawing Press Built by the Ferracute Machine Company, Bridgeton, N. J.

designed by the president and mechanical engineer of the company, Oberlin Smith.

The frame is massive, being composed of a trussed bed resting on shelves in the columns to which it is securely bolted. Each column is reinforced with two 4½-in. steel rods. The distance between columns is 100 in., and the depth of bed (front to back) is 48 in. The hole in the bed is 60 by 18 in. The distance from the bed to the outer ram at the top of the stroke and adjustment is 32 in., and of the inner ram or plunger, 35 in. The stroke of the outer ram is 6 in. and the plunger has 15 in. stroke. The ram and plunger have each 6 in. adjustment; the ram is adjusted by the round nuts shown in the illustration and the adjustment of the plunger is accomplished by the hand-wheels. The crank shaft is forged from high carbon steel and is 10 in. diameter. It is reinforced by the long pitman strap that unites the shaft to the plunger, being connected thereto by two pitman stems. The latter are threaded and are caused to revolve simultaneously when being adjusted by a shaft carrying bevel gears. An endless link belt joins the handwheels, caus-

stroke by the friction clutch. The press is shown equipped with a positive knockout. The weight of the press is 94,000 lbs.; it is 13 ft. high, 16 ft. wide and 7 ft. deep and exerts a pressure of 500 tons. It is designated as press SA175.

A notable hydroelectric project is embraced in plans covering work now in progress and future undertakings of the Northern Montana & Idaho Power Company, Sandpoint, Idaho, under the direction of the H. M. Bylesby Company, engineer, Chicago. This system will eventually include three hydroelectric power stations, with a reserve steam plant at Polson. The capacity of the station at Big Fork, Idaho, is to be increased by the installation of a 750-kw. water turbine set, where further improvements will include enlarging the canal and putting in a forebay and new head works. A high tension transmission line carrying 60,000 volts 25 miles in length will be run from Sandpoint to Newport, and at the latter place an office building and substation will be located. On the Moyie River project, near Bonner's Ferry, a dam will be built.

The Heat Treatment of Spring Steel.*

Results of Tests by the Baldwin Locomotive Works.

BY LAWFORD H. FRY, PARIS.

The following is an account of a series of tests made at the Baldwin Locomotive Works in 1907, to determine the effect of certain heat treatments on the transverse elastic limit, and on the modulus of elasticity of the steel commonly used in America for locomotive carrying springs. The points under investigation were:

1. The effect of annealing.
2. The comparative effect of quenching in water and in oil.
3. The effect of reheating the steel to various temperatures after complete cooling in water or in oil.

The steel experimented upon was basic open hearth spring steel, furnished by the Carnegie Steel Company, and its chemical composition was:

	Per cent.
Carbon	1.01
Manganese	0.38
Phosphorus	0.032
Sulphur	0.032
Silicon	0.13

The test pieces used were 1 in. in diameter and 14 in. long, with a uniform circular cross section. Ten test pieces were cut from the same bar of steel, stamped with

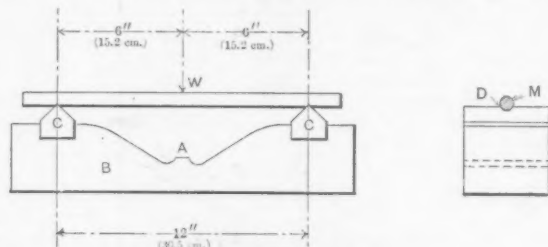


Fig. 1.—Test Piece and Support.

Nos. 11 to 20 and treated as indicated in Table I, which also shows the effect of the treatment on the physical quality of the steel.

Method of Heating and Cooling the Test Pieces.

In the experiments, the temperature at which the specimens were quenched was not varied, as experience has shown that there is a definite temperature for any given steel, size of work and method of quenching, at which the steel should be quenched to obtain the best results. Steel can be hardened by heating it to and quenching it at any temperature equal to or higher than its "critical point," but the higher the temperature at which it is quenched the coarser becomes the grain and the more brittle the steel. It is, therefore, desirable to quench the steel close to the critical point, but in practice it is found necessary to allow a certain margin above the theoretical hardening temperature. This margin above the critical point is affected by the sizes and shape of the work and the method of quenching. Having been once determined this proper quenching temperature should be always used, any variation in the final degree of hardness being produced by a change in the temperature at which the temper is drawn, or the heat conductivity of the quenching bath.

By means of a magnet the "critical point" or point of recalescence of the steel experimented upon was found to be 1360 degrees F. Previous experience with the steel has shown that for annealing, the steel should be heated to 40 or 50 degrees above the critical temperature, and that for hardening it should be brought to 50 or 100 degrees above the critical temperature, the exact temperature being determined by the size of the work and the effectiveness of the cooling bath.

For the present investigation the following tempera-

tures were decided upon, they having been indicated by previous experience to be the most desirable:

	Degrees F.
For annealing.....	1,400
For quenching in oil.....	1,450
For quenching in water.....	1,425

All the operations were carried out at these temperatures, and the heats at which the temper was drawn and the mode of quenching were the only variables in the heat treatment. The test pieces were heated in a lead bath specially constructed to secure control and uniformity of temperature. The lead was contained in a cast iron pot placed in a circular brick lined furnace. Six burners uniformly spaced admitted a gas blast at a tangent with the brick walls, so that the flame rotated around the lead bath without impinging upon it at any point. The temperature of the lead bath was registered by means of a Bristol electric pyrometer.

For annealing, the test pieces were plunged in the lead, the bath heated to 1400 degrees and kept at that heat for two hours, and then allowed to cool off naturally with the furnace, the top of the pot being covered. The time of cooling was 14 hours.

For hardening the test pieces were brought to the temperature indicated above and then quenched: 1, In oil at a temperature of 80 degrees F., the oil conforming to the Baldwin Locomotive Works specification for tempering oil, which requires a fire test of 600 degrees F. or over, and a specific gravity of not less than 25 degrees B. at 60 degrees F.; or, 2, in pure running water at 60 degrees F. The test pieces while being quenched were kept agitated until cooled to the temperature of the bath.

For drawing the temper up to 600 degrees F., the test pieces were placed in an oil bath heated by gas, the temperature being registered by means of a mercury thermometer; for drawing the temper above 600 degrees F. the test pieces were placed in the lead bath, the temperature being registered by the Bristol pyrometer. After the temper was drawn to the desired temperature, the test pieces were taken out of the bath and left to cool naturally in the air.

Method of Testing.

All the specimens were tested transversely. They were placed on supports 12 in. apart and the loads applied in the middle. The arrangement of the forged steel base B and the tool steel blocks C is shown in the sketch. The bottom of the base was carefully planed and finished and the tool steel blocks C, supporting the specimens, had been scraped to fit the base exactly, so as to allow of no play or deformation when the loads were applied. The top of the tool steel blocks was rounded off at D, to the shape of the test pieces, so as to give a good bearing; but even so it was found that the blocks would cut into the test pieces 0.001 or 0.002 in., and in order to remove as far as possible any error in the measurement of the deflections due to this cause, the specimens were subjected, before the test was begun, to the repeated application and release of a load which stressed them to about two-thirds of the elastic limit. This load was applied and released often enough to seat the test piece on the supports without giving it a permanent set. When the test piece was seated, the test proper was begun, and the height and deflections of the bars measured at their centers, with an inside micrometer, measuring to 0.00001 in., one point of which rested in a small center punch hole in the base, shown at A. The deflections were increased by steps of 0.0005 in. at a time and the loads measured for each increment of deflection. After having begun a test, the test piece was not released until the test was ended, as this was found to be the most accurate method; there is, therefore, no record of the permanent sets above the elastic limit.

Computation of Results.

The results obtained are shown in Table I. [A stress strain diagram prepared by the author is omitted here.] The elastic limit is that point where the ratio of deflection to stress ceases to be appreciably constant, and the deflection begins to increase at a faster rate than the stress. The fiber stresses, elastic limit and modulus of

* A paper read at the Copenhagen Congress of the International Society for Testing Materials, September 7-11, 1909. Mr. Fry is technical representative in Europe of the Baldwin Locomotive Works.

elasticity were calculated from the usual formulæ for a simple beam supported at both ends and loaded at the middle as follows:

$$S = \frac{Wlc}{4I} \dots (1) \quad f = \frac{WP^3}{48EI} \dots (2) \quad E = \frac{WP}{48fI} \dots (3)$$

and combining (2) and (3)

$$f = \frac{SP}{12Ec} \quad E = \frac{SP}{12fc}$$

where

S = maximum fiber stress in pounds per square inch.

W = load in middle in pound.

l = span = 12 in.

I = moment of inertia of cross section = $\frac{\pi d^4}{64}$ or a

round section.

f = deflection in the middle in inches.

E = modulus of elasticity.

c = distance of neutral axis to outermost fibres = $\frac{d}{2}$

d = diameter of test pieces in inches.

ling the temper to 750 degrees F. gave the highest elastic limit, 240,800 lb. per square inch, and the modulus of rupture was then higher than the elastic limit, viz., 389,000 lb. per square inch. The deflection at the breaking point was 0.744 in. If the temper was drawn to 900 degrees F. the elastic limit fell slightly, being 233,900 lb. and the specimen did not break under a 1.1 in. deflection. When the temper was drawn to 1050 degrees F. the elastic limit dropped to 180,700 lb. and the test piece did not break under a 1.1 in. deflection.

The Modulus of Elasticity.

The results of the tests show that the modulus of elasticity is practically constant, and apparently independent of the heat treatment given. The modulus of elasticity is difficult to determine accurately, on account of the precision required in measuring the deflections and loads, which vary by very small amounts. It is to be noted that any error in the measurements is likely to make the value of the modulus smaller than it really should be. The modulus of elasticity is the ratio of the

Table 1.—Results of Tests of Spring Steel.

No. of tests.	Heat treatment.	Elastic limit. Pounds per square inch.	Modulus of elasticity.	Diameter of test piece. Inches.	Moment of inertia.	Breakage deflection.—Inches.
17	Annealed in lead at 1400° F.	78,500	27,550,000	0.991	0.04730	Did not break.
11	Hardened in oil at 1450, drawn to 560° F.	137,500	28,700,000	1.000	0.04909	Did not break.
14	Hardened in oil at 1450, drawn to 500° F.	160,400	27,150,000	1.000	0.04909	Did not break.
19	Hardened in oil at 1450, drawn to 400° F.	177,600	29,080,000	0.991	0.04730	Did not break.
12	Hardened in oil at 1450° F., not drawn.	187,400	28,610,000	0.993	0.04772	Did not break.
16	Hardened in water at 1425, drawn to 1050° F.	180,700	28,070,000	0.997	0.04850	Did not break.
13	Hardened in water at 1425, drawn to 900° F.	233,900	28,860,000	0.998	0.04870	Did not break.
15	Hardened in water at 1425, drawn to 750° F.	240,800	29,220,000	0.994	0.04790	0.744
20	Hardened in water at 1425, drawn to 600° F.	219,800	30,420,000	0.991	0.04730	0.175
18	Hardened in water at 1425° F., not drawn.	212,000	29,960,000	0.991	0.04730	0.175

Test pieces 17, 11, 14, 19, 12, 16, 13 did not break under a deflection at the middle of 1.1 inch.
Test pieces with uniform round cross-section placed on supports 12 in. apart, load applied in middle. Chemical analysis of steel used: Carbon, 1.01; phosphorus, 0.032; manganese, 0.38; sulphur, 0.032; silicon, 0.13.

Discussion of the Results.

Annealing.—The steel used in the tests, when thoroughly annealed in the manner above described, had an elastic limit of 78,500 lb. This, as shown below, is equal to about one-half the elastic limit generally obtained with this steel when given a "spring temper," and is equal to about one-third the elastic limit of the same steel when quenched in water and drawn to 750 degrees F.

Oil Hardening.—The highest elastic limit obtainable with the steel used, when quenched at 1450 degrees F. in oil, was 187,400 lb. per square inch, and this was obtained when the temper was not drawn after quenching. The higher the temperature to which the temper was drawn, the lower the elastic limit fell. Drawing to 400 degrees F. gave 177,600 lb., drawing to 500 degrees F. gave 160,400 lb., and drawing to 560 degrees F. 137,500 lb. per square inch elastic limit. None of the oil-treated specimens broke under a 1.1 in. deflection. The usual "spring temper" given in shop practice would be: Quenching from about 1450 degrees F. in oil and drawing the temper to between 400 degrees and 575 degrees F. It will be seen that this practice would give an elastic limit varying from about 130,000 lb. to about 175,000 lb. per square inch, and an average of about 150,000 lb. per square inch.

Water Hardening.—When the steel was quenched at 1425 degrees F. in water and the temper not drawn after quenching, the steel was brittle and broke at 212,000 lb. modulus of rupture, the elastic limit being the same as the modulus of rupture, and the deflection of the breaking point being 0.171 in. (The term "modulus of rupture" has a conventional meaning. It expresses in pounds per square inch the apparent maximum fiber stress, tension or compression of a member transversely loaded, as it is just on the point of breaking; the stress being calculated by the common beam theory, with its three important assumptions, which are known to be inaccurate above the elastic limit.)

Drawing the temper to 500 degrees F. gave an elastic limit of 219,800 lb., with the elastic limit still equal to the modulus of rupture; or, in other words, the ratio of stress to strain was constant up to the breaking point. The deflection at the breaking point was 0.175 in. Draw-

stress to the strain, or in this case the modulus of elasticity, E , varies as $\frac{\text{stress}}{\text{deflection}}$. Now, all measurements of the deflections have a tendency to be too large and consequently the values found for E have a tendency to be too small, because the blocks and base on which the specimens rest are compressed to a certain amount by the loads on the test pieces, and if not perfectly fitted the blocks take a certain set which, together with the compression of the support, is measured with the true deflection of the test pieces and added to the true deflection in all the computations. Also, the softer the test pieces the more difficult it is to prevent the supports from denting it under load. The values obtained for the modulus of elasticity varied from 27,150,000 to 30,420,000. It would seem that the higher values are more probably correct, and that the true modulus of elasticity of the steel apparently lies between 29,000,000 and 30,000,000 and is probably unaffected by the heat treatment.

Conclusions.

Steel of 1 per cent. of carbon, when quenched in cold water from above its "critical point," is usually too hard and too brittle to be used for the making of springs or tools. The theory of the hardening of steel tells us that there are two ways of modifying this hardness and brittleness of the steel. They are: First, allowing some of the carbon fixed in the "hardening" form by quenching, to change back to the "annealing" form, by reheating the steel above 400 degrees F. The higher this reheating or "drawing of the temper" is carried, the softer the steel becomes; second, using a quenching bath having a lesser heat conductivity. The slower the steel is cooled from above the "critical point" to about 400 degrees F., the more carbon is allowed to change to the "annealing" form and the less the steel hardens. By the second method, steel can be obtained of different degrees of hardness without "drawing the temper" after hardening the steel. These two methods of regulating the hardness of steel in hardening can also be used jointly.

These points are illustrated in the tests. The higher the temper is drawn after hardening the lower the elastic

limit falls; also a lower elastic limit is obtained with the test pieces quenched in the bath having the lesser heat conductivity, viz., oil. The tests show that the elastic limit of 1 per cent. carbon steel can be made to vary from 78,500 lb. per square inch to 240,800 lb. per square inch by changes in the heat treatment, and that very small changes in the "drawing of the temper" are sufficient to affect the elastic limit of the steel. This proves once more that the heat treatment of steel is a delicate and accurate operation, and that to obtain good and uniform results it is necessary to have means of heating the steel uniformly to the proper temperature and cooling it at the desired rate in a cooling medium, the tem-

The Wheeler Dry Tube Condenser.

Whereas a few years ago, with reciprocating engines, a vacuum of 26 in. was regarded as all that was necessary, now, with steam turbines able to deal efficiently with steam in large volumes and showing a gain of perhaps 5 or 10 per cent. in steam economy for every additional inch of vacuum above 26 in., the question of condenser efficiency has become of great importance. When it came to a scientific investigation of means to improve the performance of surface condensers it was found that the considerations most needing attention

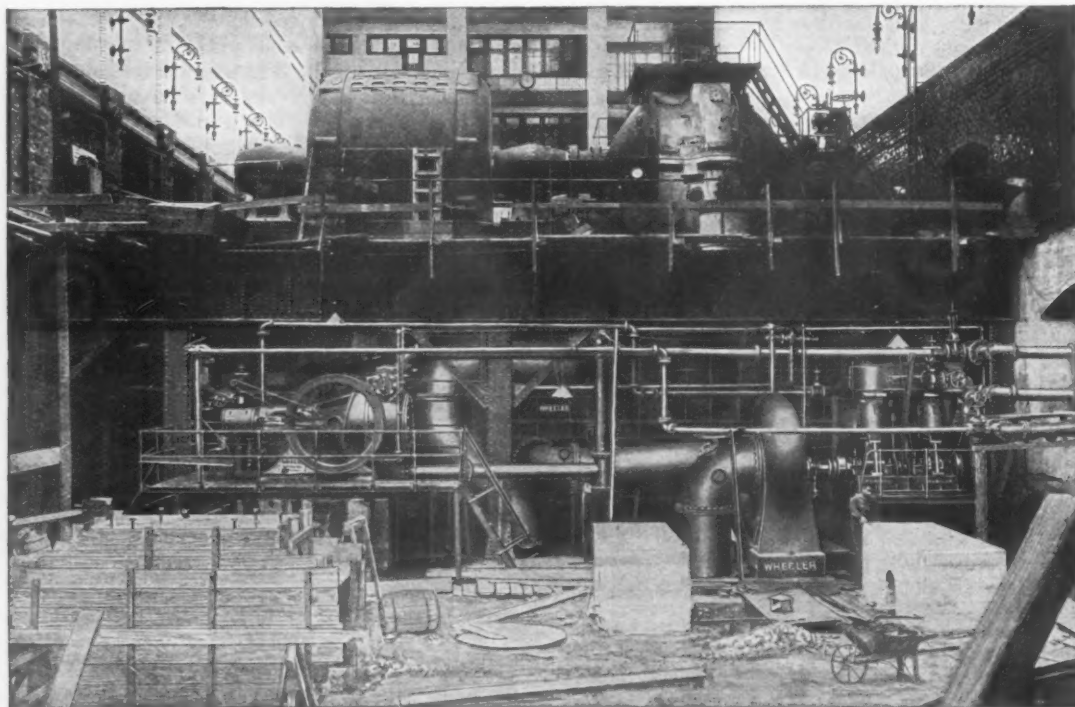


Fig. 1.—A Wheeler Surface Condenser Equipment in the Kent Avenue Station of the Transit Development Company, Brooklyn, N. Y.

perature and heat conductivity of which can be kept reasonably constant.

The Port Arthur Board of Trade, Port Arthur, Texas, has issued an interesting pamphlet setting forth the achievements and advantages of the city. Its commerce has grown so rapidly that in the volume of its ocean commerce, foreign and domestic, it has attained twelfth place among the ports of the United States. It has handled vessels from Europe since 1899 only. The depth of its harbor is 25 ft. Unlike Galveston, its harbor is land locked, and therefore safe for shipping. Its immediate territory is rich in oil, sulphur, timber and rice, while it is connected with Kansas City and Omaha by a direct line of railroad traversing a country of great resources in grain, coal, cattle, cotton, fruit and iron ore.

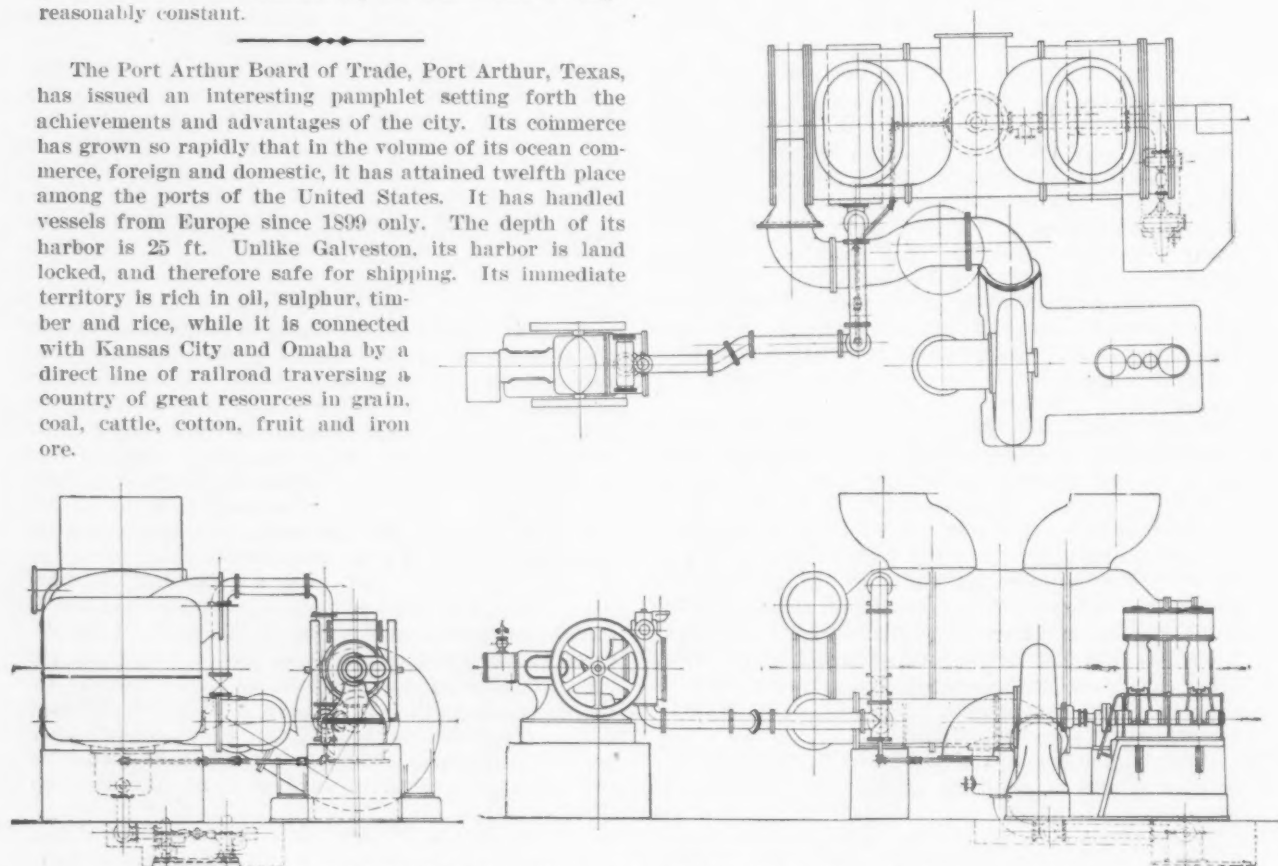


Fig. 2.—End and Side Elevations and Top View of the Condenser Equipment.

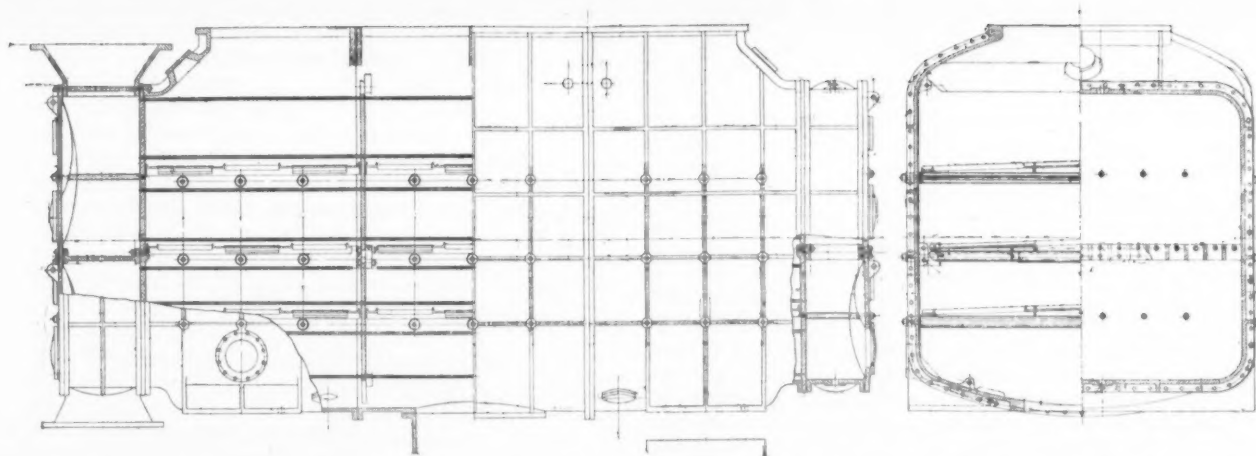


Fig. 3.—Longitudinal and Transverse Sections of the Wheeler Dry Tube Condenser, Showing Rain Plates to Protect the Lower Tubes from Water from Steam Condensed on the Upper Tubes.

were the avoidance of air drowning, that is preventing the tubes from being submerged in an atmosphere of air, and of water flooding, that is preventing the lower tubes from being flooded by water descending from the tubes above.

Air drowning is prevented by avoiding air leaks, providing sufficient air pump capacity and arranging for removing the air at the lowest possible temperature and hence the greatest density. The flooding of tubes has been avoided in part at least in various ways. Some designers have arranged to have the steam flow horizontally through the condenser, which, however, causes the condenser to occupy more floor space than is desirable, and does not permit the flow of air in the natural direction. Others have sought to cut up such horizontally arranged banks of tubes into sections, placing them one above the other, and then cause the steam to traverse the groups of tubes horizontally in succession, flowing first one way through the upper group, and then in return through the next lower group, and so on. This also has an objection in that it involves a cumbersome, heavy ungainly condenser shell containing a great deal of waste space. One of the most successful arrangements seems to be that which has been adopted by the Wheeler Condenser and Engineering Company, Carteret, N. J., in what is known as its dry tube condenser, one of which, installed in the Williamsburg power station of the Transit Development Company in Brooklyn, N. Y., is shown in Fig 1. In appearance it is similar to the company's Admiralty condenser first introduced about 20 years ago and has many of the merits inherent in that design such as compactness and ease of accessibility.

As shown in Fig 2 there are two exhaust steam inlets at the top of the shell to receive the steam from the double-flow Westinghouse turbines installed on the floor directly above. The circulating water from the engine-driven centrifugal circulating pump is introduced into the lower compartment of the water box at one end and makes two passes through the tube before being discharged from the upper compartment of the water box. The condensation is collected in a cylindrical well forming a part of the bottom of the condenser shell, whence it is removed by a centrifugal hot well pump. The air is taken from the side of the condenser at a point near the cold water inlet and is exhausted by a rotative dry vacuum pump. The novel feature of the condenser lies in the horizontal baffles interposed between the several banks of tubes. These rain plates, as they are called, catch the water from the tubes above them and carry it to the outside against the shell down which it flows to the hot well without coming into contact with other tubes. To permit the passage of the steam past these rain plates there are openings, around the edge of which the plate is turned up to form a vertical lip, preventing an overflow of water. These openings are so staggered that the steam will reach all parts of the tubes, insuring complete utilization of all the surface.

Simple as this expedient appears, the results obtained

from it have been remarkable. It was formerly customary to assume the rate of heat transfer through surface condensers, closed feed water heaters and similar appliances as between 200 and 300 B.t.u. per square foot per hour per degree difference of temperature between the water inside the tubes and the steam outside. Inasmuch as the temperature of the water within the tubes rises as heat is absorbed, while the temperature of the steam outside falls somewhat, as the mixture becomes richer in air, it is necessary to adopt some method of calculating the average difference of temperature. A simple one is to take the arithmetic mean—that is, add the entering and leaving temperatures of the circulating water and divide by two to find the average, which is subtracted from the steam temperature corresponding to the vacuum or from the mean between the latter and the hot well temperature to give the mean difference in temperature. If greater refinement is desired, the logarithmic mean of the water temperatures may be taken, although it is doubtful if much greater accuracy is gained thereby.

The condenser before mentioned was designed to handle 180,000 lb. of steam per hour, and to give a vacuum equivalent to 2 in. absolute pressure with a 70-degree F. temperature of the circulating water. In tests which have been made of this condenser the transmission of heat per square foot per hour per degree difference in temperature was found to be between 500 and 900 B.t.u. when the rate of condensation varied from 164,586 to 220,200 lb. This is two to three times greater than that which is obtained from the ordinary surface condenser. The results show that the guaranteed vacuum could have been maintained with even less condensing surface than was actually installed, although the latter is considerably below usual practice—that is, while the ordinary condenser would contain 2 or 3 sq. ft. of surface per rated horsepower, this condenser contains only 1.5 sq. ft. per rated electrical horsepower. Another point noticed was the high temperature of the condensate at all times, closely approaching the theoretical temperature of the steam vapor. Inasmuch as this condensate is used as boiler feed and as each 10 degrees F. amounts to about 1 per cent. of the fuel bill, it is also highly important from the standpoint of plant economy.

The illustration, Fig. 3, gives longitudinal transverse sections of the Wheeler dry tube condenser, showing the rain plates which protect the lower tubes from water and steam condensed on the upper tubes. The construction is brought out in the latter in a way which scarcely calls for further description.

The Landgraf-Turner alternating impact testing machine, made by Queen & Co., Philadelphia, is entering into general use for the testing of steels by impact. That firm has just furnished one of these machines to the Bureau of Standards, Washington, D. C., and has also received an order from the Royal Italian Navy for one to go to Italy by the Italian cruiser now in New York harbor.

The Iron Ore Deposits of Swedish Lapland.

Now that American furnacemen are to use considerable quantities of Swedish ores it may be of interest to present some data relating to them which are largely gleaned from the description by P. Nicou in the *Annales des Mines*, Paris.

The Gellivara Deposits.

The Gellivara District was the first of the deposits of iron ore in Lapland to be developed. It is situated in the province of Norbotten at 67 degrees latitude, and is therefore north of the Arctic Circle. The district is connected by rail, 132 miles long, with the port of Lulea on the Bay of Bothnia, the road having been extended in a northwesterly direction via Kiruna to the port of Narvik on the Ofoten Fjord. The former is a port closed in the winter, while Narvik is open all the year round. The deposits are located on the Malmberget or Ore Mountain, rising to a height of about 625 ft. The mineral field contains a large number of lenticular masses varying very considerably in size and covering a space of about $3\frac{1}{2}$ miles in length by $1\frac{1}{2}$ miles in greatest breadth. The lenses, whose dip is on an average 50 to 60 degrees south, consist chiefly of magnetite and a small quantity of hematite. They lie in echelon and form a northerly series, on which are located the Koskullskulle, Hoftafors, Dennewitz, Tingvallskulle, Vulkan, Sofia, Josefina, Uppland, Skane Oscar, Hermelin, Baron, Linne, Valkomman and Johan mines, and a minor southerly series with the Frederikas, Kaptén, Hertigen and Selet mines. The production is shown in the following table in metric tons:

Years.	Kiruna K. Company.	Freya Company.	Total.
1887-1893.....	608,492	.....	608,492
1894.....	655,260	.....	655,260
1895.....	612,308	.....	612,308
1896.....	595,470	.....	595,470
1897.....	621,566	.....	621,566
1898.....	843,899	12,352	856,431
1899.....	838,812	116,062	954,874
1900.....	826,218	127,360	953,578
1901.....	972,052	104,054	1,076,106
1902.....	977,744	111,272	1,089,016
1903.....	928,717	138,852	1,067,569
1904.....	972,375	142,989	1,115,364
1905.....	916,369	164,876	1,081,245
1906.....	894,747	210,053	1,104,800
1907.....	929,421	211,883	1,141,304
Totals.....	12,193,450	1,339,933	13,533,383

It is estimated that since 1887, the date of the discovery of the mines, the total output has been 13,725,000 tons.

Open-cast mining is employed in all the lenses of the northerly group, access being had by numerous tunnels placed from 25 to 70 ft. apart vertically. Usually every level has its tunnel from the mouth of which inclines lead to the loading station. In the open pits the rock above the hanging wall must be removed until a safe wall is obtained. Owing to this and to the beds of gneiss a good deal of rock must be mined. In 1905, for instance, the relation between rock and ore in the northerly group was as follows, quantities being in metric tons:

Name of lens.	Ore mined.	Ore and rock. of ore.	Average per-centage since Per-centage of ore
Linne and Valkomman.....	167,826.6	256,670.2	65.4 49.4
Baron	23,467.6	116,419.4	20.2 41.6
Hermelin	42,603.3	65,572.9	65.0 76.6
Josefina, Skane, Uppland.....	195,256.6	304,316.4	64.1 55.4
Sofia and Vulkan.....	162,780.0	497,411.2	32.7 43.1
Tingvallskulle	141,605.1	280,691.9	50.7 58.3
Totals.....	733,539.2	1,521,086.0	48.2 58.9

Since 1895 the mines of the southern group have been operated by shafts. This is due to the fact that when first worked they were close to the shipping station Malmberget, and were richer in the more readily reducible hematite, which is usually very low in phosphorus. In consequence of their location open pit mining did not last long. In the southern group there are granite veins up to 15 feet thick which fairly follow the lenses

both in strike and in dip. The more valuable ores low in phosphorus are found chiefly near the foot wall. In 1895 the production of the southern mines was 179,933 tons, in mining which 217,538 tons of rock was broken.

The ores carry very little sulphur and impurities like lime or silica. The latter, however, predominates so that the ores may be designated as siliceous. The ores are classified according to phosphorus contents, A carrying less than 0.05 phosphorus, B, 0.05 to 0.1, C, 0.1 to 0.8, D, 0.8 to 1.5 and E more than 1.5 per cent. phosphorus. Frequently a class CD is interposed between C and D. In 1906 the classes mined by the Kiruna Company showed the following averages:

Class.	Phosphorus. Per cent.	Iron. Per cent.	Participation in output. Per cent.
A	0.025	69.23	4
C	0.293	67.03	12 to 18
CD	0.536	65.91	25 to 35
D	1.424	62.47	40 to 50

A small quantity of low phosphorus is therefore produced. The Koskulla lens of the Freya Company, on the other hand, furnished only A ores carrying in 1906, 67 per cent. of iron and 0.03 per cent. of phosphorus. The following statement of the average analyses of the Gellivara ores covers the 1907 sales of the firm of W. H. Mueller of Rotterdam:

	A ore.	C ore.	CD ore.	D ore.
Fe	68.575	66.47	65.32	64.21
Mn	0.14	0.126	0.1	0.13
SiO ₂	1.78	2.869	3.0	2.15
P	0.02	0.32	0.62	0.98
S	0.03	0.02	0.05	0.03
CaO	0.325	0.857	2.25	3.60
MgO	0.47	0.51	1.28	1.00
Al ₂ O ₃	0.4	0.388	0.70	0.80
H ₂ O	0.1	0.32	0.245	0.20
TiO ₂	Trace.	0.25	0.34	0.46

The importance of the different lenses belonging to the Kiruna Company in the Gellivara district is shown in the following table, quantities being in metric tons:

	Present depth of mines in meters.	Ore ready for mining.	In sight 100 m. below pres- ent level.	Total.
1. Southern mines:				
Selet	70	12,800	675,000	687,800
Kaptén, Frederikas, Hertigen	50-120	490,700	3,240,000	3,730,700
2. Northern mines:				
Koskullskulle	23	800,000	9,000,000	9,800,000
Dennewitz	7	62,800	2,835,000	2,897,800
Hvitåfors	0	62,800	1,624,000	1,624,000
Alliansen	0	62,800	1,300,000	1,300,000
Tingvallskulle	45	1,121,200	6,615,000	7,736,200
Sofia and Vulkan.....	55	1,484,700	5,880,000	7,364,700
Uppland	45	44,600	1,102,500	1,147,100
Josefina	32	34,200	1,650,000	1,684,200
Skane	30	107,100	2,520,000	2,627,100
Hermelin	35	91,600	1,210,000	1,301,600
Baron	40	247,700	1,680,000	1,927,700
Valkomman, Linne.....	60-30	173,700	6,500,000	6,673,700
Johan	45	173,700	600,000	600,000
Totals.....		4,671,100	46,431,500	51,102,600

The total of 51,000,000 tons does not imply the exhaustion of the mines. There is no direct indication that the lenses do not continue in depth and there have been ignored in the calculation such lenses as have not yet been touched.

The Kiruna Deposits.

Sixty-five miles north of Gellivara is Kiruna, located 67 degrees 50 minutes latitude, the group being the most important of the Swedish mines. The deposits are found in the two hills of Kirunavara and Luossavara parallel to one another, with the Luossajarvi Lake stretching from the westward between them. The distance to Lulea on the Bay of Bothnia is about 190 miles and to the harbor of Narvik in the Ofoten Fjord about 105 miles. The level of Loussajarvi Lake is about 1575 ft. above the sea. Although known since 1875 it was not until 1900 that development began. The first ore train was started to Narvik November 15, 1902. The production was 119,620 metric tons in 1901, 232,327 tons in 1902, 871,315 tons in 1903, 1,175,709 tons in 1904, 1,391,403 tons in 1905, 1,488,021 tons in 1906 and 1,417,929 tons in 1907.

The Kiruna deposit differs entirely from that of Gellivara. The former consists of a single long vein within

eruptive porphyry. Along the whole ridge of the Kiruna hill the ore crops out and shows a series of jagged elevations which rise from 530 to 715 ft. above the lake. The outcrop may be followed for a distance of nearly 2 miles. The dip ranges from 50 to 70 degrees and the thickness varies from 160 to 550 ft.

To the north the vein continues under the lake, as shown by magnetic surveys and by drilling. To the south there are several other separate veins. In the general direction of the Kiruna deposit there is on the northern shore of the lake the Luossavara deposit, which does not connect with the main vein and is smaller. It is estimated that down to the lake level the Kiruna deposit has available 200,000,000 tons of ore.

The ore is mined in open cut in lifts ranging from 40 to 70 ft. in height, every third lift being made a main level, from which inclines lead to the loading stations. The following data show the quantity of ore to the amount of rock broken, in metric tons:

Year.	Ore.	Rock.	Total.	Percentage of ore.
1902.....	232,327	48,778	281,105	82.5
1903.....	871,315	80,596	951,911	91.5
1904.....	1,175,709	145,794	1,321,503	88.9
1905.....	1,391,402	290,412	1,681,814	82.7
1906.....	1,488,021	538,888	2,026,909	73.4
1907.....	1,417,929	334,254	1,752,183	80.9

The costs of mining at Kiruna are much lower than those of Gellivara, being about 1.15 to 1.20 crowns (1 crown=26.8 cents) per ton. The ores are dense without the slightest crystalline structure, the fracture being like that of steel. The ore is magnetite and contains phosphorus as apatite, so closely intermingled, however, that cobbling by hand is usually impossible. At the present time the following six grades are distinguished:

- A. Below 0.05 phosphorus.
- B. Up to maximum of 0.1 phosphorus.
- C. Up to maximum of 0.6 phosphorus.
- D. From 0.75 to 2.5 phosphorus.
- F. From 2 to 3 phosphorus.
- G. Above 2.5 phosphorus.

The class A and B ores are exclusively drawn from the Vaktmastaren mine; C ores from the Vaktmastaren, Professoren and Landshofdingen mines; D ores from all mines now being worked with the exception of the Professoren mine; G ores from the Geologen and F ores from the Grufingenioren mine. Up to and including 1906 the different classes were mined as follows, in metric tons:

Percentage.			Percentage.		
Ores.	Tons.	of total.	Ores.	Tons.	of total.
A	859,628.7	16.6	D	3,536,624.7	68.2
B	5,184.2	0.1	F	200,979.0	3.9
C	222,491.7	4.2	G	359,322.2	7.0

The exact composition of the Kirunavara ores may be noted from the following analyses:

	Fe ₂ O ₃	Fe ₂ O ₄	MnO	MgO	CaO	Al ₂ O ₃
A.....	9.06	95.99	0.21	0.73	0.67	0.40
B.....	0.53	86.53	0.19	0.77	0.67	1.07
C.....	0.94	91.50	0.20	1.45	2.22	0.81
D.....	3.50	84.10	0.31	0.76	5.50	0.06
F.....	5.62	78.49	0.25	0.61	7.27	0.36
G.....	4.58	76.01	0.93	0.75	8.92	0.79
G.....	5.83	65.31	0.15	1.15	14.04	1.26

	TiO ₂	SiO ₂	P ₂ O ₅	S	Fe	P
A.....	0.80	1.39	0.017	0.022	69.55	0.022
B.....	0.45	0.91	0.020	0.026	69.34	0.098
C.....	0.21	1.74	1.280	0.018	66.92	0.561
D.....	0.25	1.10	4.140	0.019	63.35	1.800
F.....	0.06	1.56	5.317	0.058	60.77	2.318
G.....	0.13	1.80	6.713	0.050	58.25	2.931
G.....	0.05	1.04	10.970	0.036	51.37	4.789

The ores sold during 1907 by the firm of Mueller of Rotterdam averaged as follows, by classes:

	A	C	D	F and G
Fe.....	69.636	67.879	62.07	58.17
Mn.....	0.05	0.1	0.08	0.1
SiO ₂	1.59	1.58	1.8	1.655
P.....	0.027	0.23	1.957	2.98
S.....	0.018	0.006	0.043	0.03
CaO.....	0.32	0.587	4.825	8.207
Al ₂ O ₃	0.3	0.49	0.04	0.175
MgO.....	0.49	0.249	0.28	0.245
Ti.....	0.07	0.669	...	...
H ₂ O.....	0.3	0.17	0.36	0.314

The Kirunavara ores are therefore rich, generally high in phosphorus, and relatively high in lime. In consequence of their great density they bear transportation and rough handling.

The Tuolluvara Deposits.

Besides Gellivara and Kirunavara, there is only the Tuolluvara deposit which is being worked at this time in Lapland. It lies about three miles from Kiruna, was discovered in 1897 by Lundbohm and belongs to the Tuolluvara Company. It has been operated since 1902, the ore being conveyed to the Ofoten railroad by wire tramway. There was mined in 1902, 6,000 metric tons; in 1903, 636 tons; in 1904, 24,513 tons; in 1905, 41,653 tons; in 1906, 80,248 tons, and in 1907, 87,977 tons. It is in an isolated hill between Kiruna and the village of Jukkasjarvi and was found by magnetic survey.

The ore is magnetite and glistens like the Gellivara ore. The iron contents fluctuate between 64.8 and 71 per cent., and the phosphorus between 0.002 and 0.10 per cent. Besides there are some titan acid, not to exceed 0.6 per cent., and steadily 0.04 per cent. of sulphur. The deposit is 2,200 ft. long and the thickness varies from 50 to 65 ft. It is estimated that the deposit contains 2,430,000 tons above the level of the valley.

A Duplex High Pressure Fire Protection System

To guard against interruptions of the service through breaks in the mains a novel arrangement will be resorted to in an extension of the high pressure fire system soon to be installed on the lower east side of Manhattan, New York City. It will be a duplex system, consisting of two interlaced but independent systems connected at three points where communication between the two parts will be controlled from the pumping station by electrically operated valves. If a break occurs in either side of the system it will be immediately shown on the Venturi chart or pressure gauges on the pumping station outlet to that side, and it can be immediately isolated by closing the three valves simultaneously, leaving the other side of the system in operation. This will take only about one minute, whereas with the present system when a break occurs it takes from 5 to 10 min. to locate it, at least 5 or 10 min. more to reach it, and anywhere from 20 to 30 min. to close by hand the two, three or four valves necessary to isolate the broken section. Meantime the entire system is out of service.

This weakness of the present arrangement has been repeatedly demonstrated, and it is to remove it that the duplex system has been devised by the Department of Water Supply. It so subdivides the general distribution system that shut-offs of sections in which a break occurs may be more quickly made. The mains of the two parts of the system will be placed in alternate streets, so that with either one out of commission the greatest distance to the nearest live hydrant within the area covered by the protection will not be over 500 ft. Either part of the system will be capable of supplying enough water for ordinary fires, but normally both will be drawn upon at the start of a fire. The extension proposed will involve some 33 miles of 6 to 24 in. cast iron flanged and bolted mains, about half of which will be 12-in. pipe, and the necessary gates and hydrants.

The construction of a steam driven power plant at Lagoon, Utah, on the line of the Salt Lake & Ogden Railway Company, general offices Salt Lake City, Utah, for the generation of electric current for the operation of the system is under way. The capacity of the new plant will be approximately 2000 hp., and will be supplemented within a year by a hydraulic installation on the Weber River, near Uintah, Utah, of 2000 kw capacity. Upon completion of the latter an auxiliary steam plant for use during seasons of low water will also be installed at this point. A separate high tension line along the right of way is under construction, and the entire equipment should be ready for operation soon after the first of the year.

The Sluyer Steel Casting Company, Milwaukee, Wis., maker of crucible and manganese steel castings, will start work immediately on the erection of an eight-furnace plant. The company's present plant contains four furnaces.

The Bickford & Washburn Pipe Tap Thread Milling Machine.

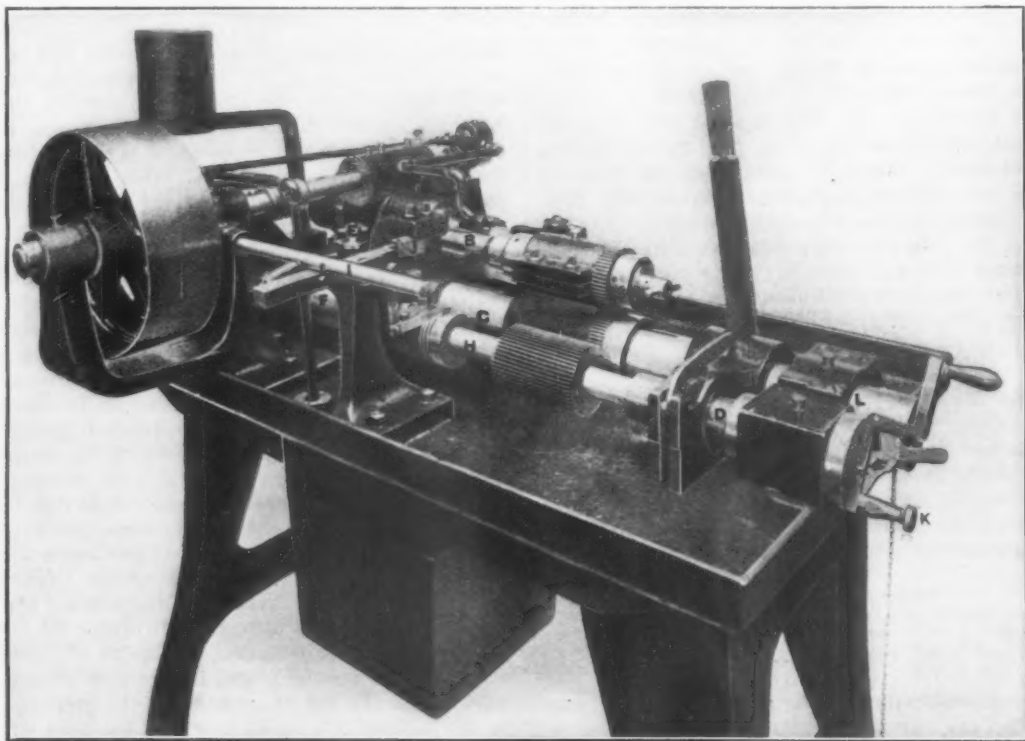
The thread milling machine built by Bickford & Washburn, Inc., Greenfield, Mass., has been developed to an important degree since the original commercial model was placed on the market. Various details have been changed, to increase the general efficiency of the tool and the convenience of its operation. It is designed to thread with a hob mill or cutter. The range is wide, as the machine handles straight and taper taps, both right and left hand, of all sizes from $\frac{1}{8}$ to 4 in. inclusive, not over 3 in. long or coarser than 6 pitch, and both Briggs' and Whitworth standards. A relief is given the tap, and by the use of a plain cutter, relief or plugging at the point may be done. A relieved thread on a pipe tap is produced at a single revolution of the work. The equipment is complete in itself, as it threads the cutters as well as the taps which they are to manufacture.

The milling cutter A is mounted in front of the tap B, parallel to it, if a straight thread is to be cut, or at

collar. Another improvement is a slot in the tail-bracket supporting the work spindle on the main bar A, which permits the screw E to be placed over any desired cam without moving the bracket, greatly facilitating setting up the machine for different sizes of taps.

In addition to the relief cams a spiral cam provides for threading the cutters. The tap blank is revolved by a dog in the front end of its spindle, which is driven from a spur gear of very wide face to allow for the travel of the carriage. One side of the work spindle nose and driving dog has been cut through so that the larger sizes of taps may be placed in the machine with very little travel of the screw center which tightens the tap in its spindle.

The cutter spindle is driven by spiral gears of coarse pitch at G. The housing has been extended over these gears and a ball bearing provided to take the end thrust of the steel spiral on the pulley shaft. The cutter is carried on an arbor, the outer end of which is supported. The arbor being short, vibration is too insignificant to be considered. The cam shaft H is driven from a short shaft by spur gears which may be changed easily to give



A Machine for Milling the Threads of Pipe Taps, Built by Bickford & Washburn, Inc., Greenfield, Mass.

the required angle for a taper thread. The cutter has circular grooves of the same cross section as the tap threads and is fluted helically to give a smooth cutting action. It revolves continuously, while the tap rotates slowly at a suitable feed, moving forward with its revolution under the impulse of the lead screw at D which is geared to the required pitch. The blank has been fluted previous to the thread cutting to permit of relieving. A rocking mechanism moves the tap in as the heel of the land is approached, and out again to full diameter for the next cutting edge.

The blank is held on centers between brackets clamped to the main bar C, which may be considered the carriage of the machine. It is carried longitudinally by the lead screw which operates through half nuts that are opened and closed by a positive locking device, which has been greatly simplified in the new model, the number of parts having been reduced. This mechanism has been provided with a small eccentric stud, with means of positive setting, to take care of any wear or inequality in size of the different lead screws and thus to maintain the proper fit in the nut. The rocking motion for the relieving operation is given to the carriage C by a screw E, the point of which rides on one of the cams F. Fine adjustment of the screw is obtained through a graduated

different feeds for different sizes of tap, fine changes being regularly furnished. The bronze bushed driven pulley runs constantly, its motion being transmitted to its shaft through a clutch operated by the lever handle I, held in position by a latch which is released automatically, throwing open the clutch, at the end of one revolution of the cam shaft, in other works when the operation on a tap has been completed.

The main head of the machine slides on its base to regulate its position for different sizes of work, fine adjustment being through the screw E. The taper of the tap is secured by a screw adjusted sliding bar J, which carries one of the centers. The lead screw is arranged to be moved quickly in changing from one pitch to another. The index pin K enters the frame of the machine and is used to advance the carriage in spacing teeth when making the cutters. During this work the lead screw is disconnected by the withdrawal of the pin I. When threading taps the index pin K is withdrawn and the pin I again enters the cam shaft, so that the lead screw is driven with the machine. This pin is now arranged to enter the end of the cam shaft instead of the side as formerly, which change permits the use of a locking lever or safety device that positively prevents the two pins from engaging the shaft at the same time.

A handle has been added to revolve the leadscrew shell when making cutters. To thread a tap the nuts of the leadscrew are opened and the carriage is drawn back by a lever M. Locking the nuts again, the finished tap is removed, a new blank inserted and the driving clutch thrown in, leaving the machine to do the work. A $\frac{3}{4}$ -in. pipe tap requires about 3 minutes.

Other changes which have been made in the machine include the connection of the pump direct to the end of the pulley shaft, obviating any chance for an oily belt to slip and permit oil circulation to stop; the addition of a weight drawing on the main bar to prevent the possibility of end play when threading cutters; another pair of change gears to give a very slow speed to obtain the best results in threading hob mills; and the addition of a loose pulley oiler to keep the pulley from running dry.

The Adams-Bagnall Regenerative Flame Arc Lamp.

A new type of arc lamp, which has been used for some time abroad, is now being introduced into this country by the Adams-Bagnall Electric Company, Cleveland, Ohio. While this lamp produces the characteristic orange ray of the ordinary flame arc, with it, it is claimed, an even greater intrinsic brilliancy, it does not in other respects conform to this type of lamp. It is known as a regenerative flame lamp for the reason that the chemicals, in

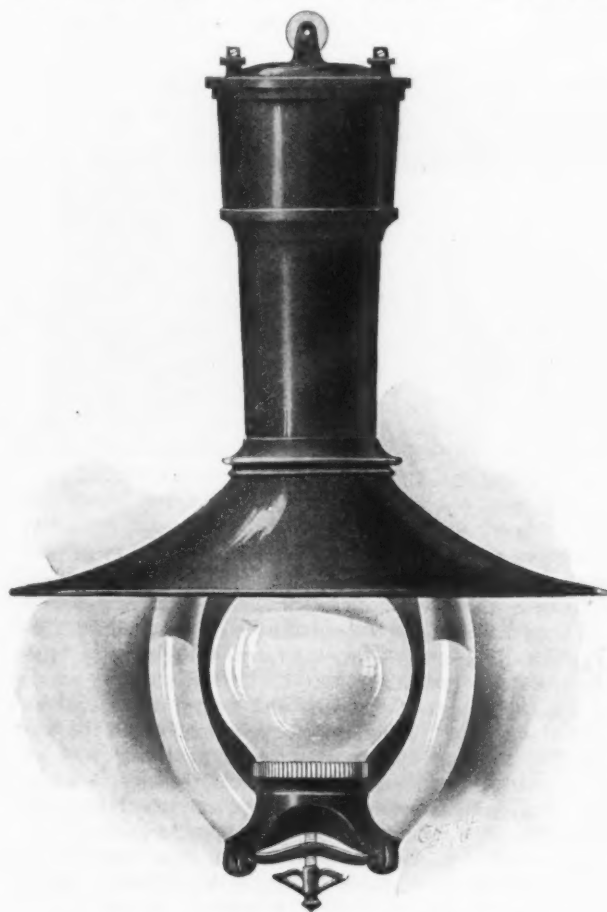


Fig. 1.—The Regenerative Flame Arc Lamp Made by the Adams-Bagnall Electric Company, Cleveland, Ohio.

gaseous form, are used over repeatedly intensifying the light. The carbons are placed vertically one above the other, and are inclosed with double globes, the inner globe of which is clear and the outer globe opalescent. The inner globe cap or top contains an opening communicating with two side tubes, which allow a free circulation of the gases in the globe permitting them to return to the bottom of the system, so that they become reheated by the arc and continue to circulate. Both the inner and outer globes are tightly seated both top and bottom to prevent ingress of air.

The design of the lamp is such as to eliminate

shadows. The lamp case is rugged and is waterproof. Over all the length is 36 in., and the weight complete, including the globes and reflector, is 40 lb. The reflector is 24 in. in diameter, is made of No. 22 gauge sheet steel, and is heavily enameled both top and bottom. The lamp mechanism is simple and accessible, insuring, it is claimed, a minimum cost for repairs and ready inspection of internal parts.

One of the remarkable features of the regenerative flame lamp is the long life of the carbons. Tests show an

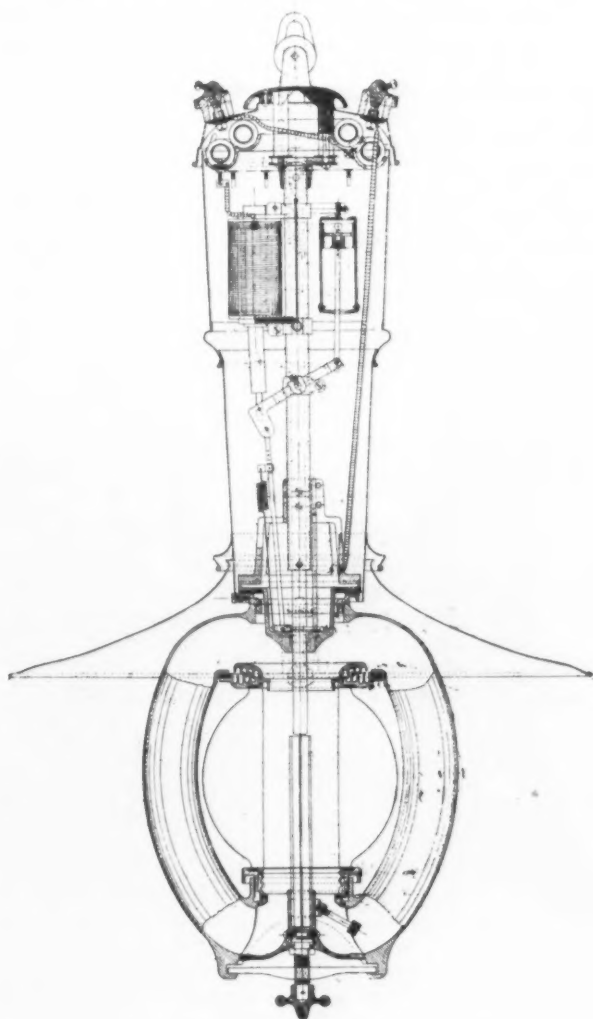


Fig. 2.—Sectional View of the Alternating Current Type of the Regenerative Flame Arc Lamp.

average life of 70 hours. The carbons are the result of considerable experimenting to discover the proper elements so as to give the desired results with the regenerative scheme. Existing forms of impregnated carbons were found to be unsuited to this type of lamp. The carbons as now used are mechanically strong, and will stand rough handling with very little danger of breaking. The upper or negative electrode is 18 in. long by $\frac{5}{8}$ in. in diameter, and is composed principally of pure carbon. The lower, or positive, electrode is 7 in. long by $\frac{7}{8}$ in. in diameter, and consists of a core or center, which is star shape in cross section, and has the radial spaces or grooves filled with a chemical composition which possesses the property of maintaining a brilliant orange ray, independent of the presence of oxygen.

The light produced, it is said, is remarkable for its harmless effect on the eye, steadiness and penetrating qualities. Charts of the light distribution and density show them to be remarkably excellent. The maximum candle power is 3400, and at an angle of about 40 degrees from the horizontal. The mean lower spherical candle power is 2200, with a consumption of only 550 watts, or the equivalent of one 5-ampere carbon lamp. A comparison with ordinary arc lamps of light values gives a ratio of at least 5 to 1, in favor of the regenerative lamp, with a diffusion which makes it admirably adapted

for general illumination, either on the street or for interior lighting.

The current consumption is $5\frac{1}{2}$ amperes for the direct current lamp and 7 amperes for the alternating current type. The lamps can be furnished for operation in multiple on 100 to 120 volt direct or alternating current, 220 to 250 volt alternating current, and multiple series 220 to 250 volt, or 500 to 550 volt direct current.

To trim the lamps the inner globe and carbons are removed together by one turn of a screw. Only one pair of carbons is used, and there are no rods or moving parts to clean. The outer globe remains in position and never requires removal which reduces the chance of breakage to a minimum. Neither is it necessary to lower the case for trimming. The slight deposit from the carbons is collected in the side tubes of the lamp, which are quickly and easily cleaned by a special brush which is supplied with each lamp.

Fig. 1 herewith gives a general view of the exterior of the lamp, and Fig. 2 a sectional view of the alternating current type which differs but slightly from that for direct current. Principally to be noticed in the sectional view are the glass tubes for the circulation of the gases.

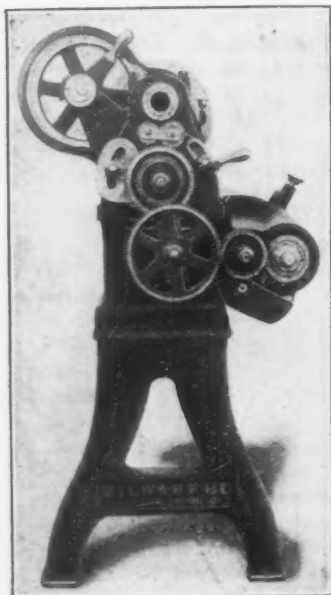


Fig. 1

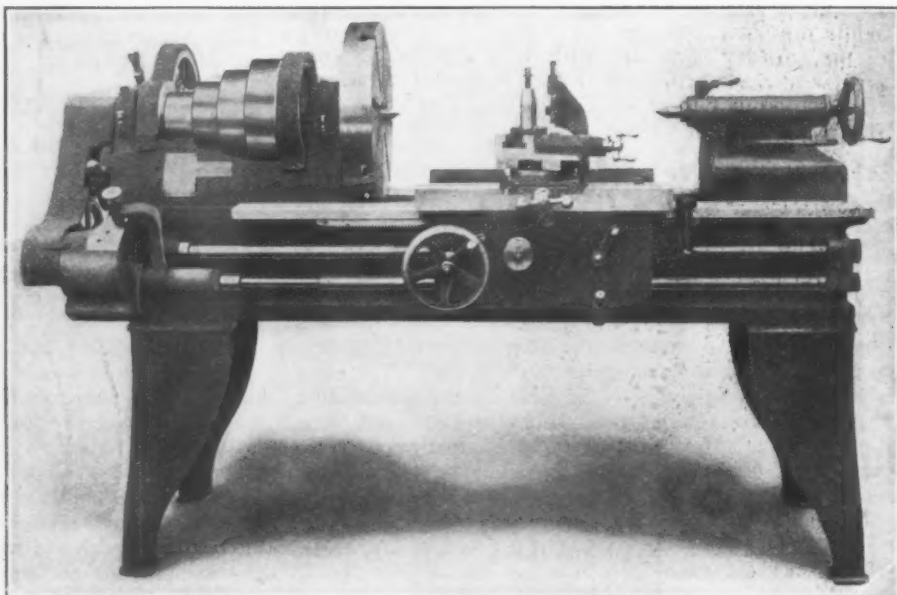


Fig. 2

The Improved 16-In. Engine Lathe Built by the Milwaukee Machine Tool Company, Milwaukee, Wis.

The same illustration shows also how simple is the operating mechanism.

The Zeppelin's Steel Belts.—According to the *Berliner Morgenpost* of August 31, 1909, Count Zeppelin's latest airship, the Zeppelin III, is provided with steel belts to transmit the power from the motor to the propeller in place of the gear transmission used in all of his earlier airships. The steel belts are of the form described in *The Iron Age*, May 20, 1909, made by the Eloesser Kraftband Gesellschaft in Berlin. Prior to the Count's recent attempt to fly to Berlin, a thorough test of the new installation was made and found to give complete satisfaction. The gears formerly used were a source of considerable trouble, being unreliable, it is stated, and the cause of many of the interruptions of the airship's operation. The above was brought to our attention by Adam E. Schatz of Mt. Vernon, N. Y., who has acquired the American rights for the Eloesser steel belt and is now making arrangements to manufacture them in this country.

The New York *Herald* of October 3 describes the Canton-Hankow Railroad, now under construction in China. The article states that "there are four Manhattan locomotives being used in construction work, and it is almost pathetic to see these pretty little machines, which once graced the elevated railways of New York, tolling away at the head of ballast and earth trains in China."

The Milwaukee Improved 16-In. Lathe.

As compared with the lathes formerly built by the Milwaukee Machine Tool Company, Milwaukee, Wis., the principal improvement on the 16-in. lathe illustrated in Figs. 1 and 2 is the provision of a friction gear drive for the feed. This may be seen in the end view of the lathe, Fig. 1, and also in connection with the gear box in Fig. 3. In effect this friction is practically the same as a belt drive, as far as slipping is concerned; but it can be tightened by using an adjusting nut, so as to be the equivalent of an all geared positive drive. Other improvements include a chasing dial for use in thread cutting, a larger swing over the ways (18% in. instead of 16% in., as formerly), guards for all gears, steel instead of cast iron for the gears in the apron, and a more powerful drive. The latter has been obtained by using four steps instead of five on the cone pulley, making it possible to widen each pulley step $\frac{1}{2}$ in., and by using larger diameter cone pulleys. The machine is extra heavy throughout; the net weight with a 6-ft. bed is 2200 lb.

The bed is unusually deep and wide and is strongly

reinforced with heavy cross ties. The Vs are large and of 45-degree angle. The approximate weight of the bed per foot is 120 lb. The pads for the lead screw and feed rod bearings are planed and grooved to templates. The bearings are planed to receive them, thus insuring true and permanent alignment.

The headstock is massive and heavy and the four step extra large diameter cone pulley affords a powerful drive. The back gearing is extra heavy and of a high ratio. A patent spring cone stop is located in the face gear, which is convenient when changing from the open belt speed to back gear. The spindle is especially large and heavy and has a 1 9-16-in. hole through its entire length. It is made from a 0.60 per cent. carbon crucible steel forging and is accurately ground. The bearings are extra large, made of a high grade phosphor bronze, and are scraped to a bearing by hand. Two large oil reservoirs are located beneath each bearing; the oil is carried to the spindle by a wick, which keeps the spindle continually wiped free from grit and dirt and affords ample lubrication at all speeds.

The tailstock is heavy, has a long bearing on the bed and is designed to allow the compound rest to be set at 90 degrees when turning the smallest diameters. Screws are provided for setting it sideways. The diameter of the tailstock spindle is 2 in. The centers are of tool steel and have No. 4 Morse taper shanks.

The machine is equipped with a change gear box and gives four practically instantaneous changes of feed through the operation of but one lever. Through the use

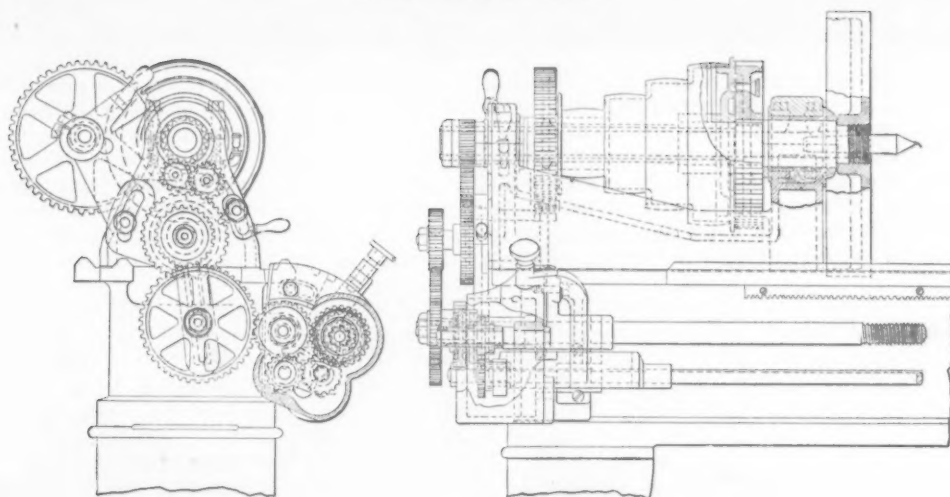


Fig. 3.—End and Front Elevations, Showing the Drive of the Feed.

of change gears, which are supplied with the machine, practically an unlimited range of feeds and threads per inch can be obtained. The friction disk applied to the gear drive is adjustable, giving any amount of tension required, and decreases the likelihood of breaking apron parts, &c., through carelessness on the part of the operator.

The carriage is extra heavy, has an exceptionally long bearing on the ways ($23\frac{1}{2}$ in.) and is gibbed to the bed its entire length. Ample T slots are provided for clamping work. The bearing surface of the carriage on the bed is not recessed, but is in full contact from end to end with the entire depth of the V, which very greatly reduces chance of chatter. Instead of an inside V at the front of the lathe a flat bearing is used. This shortens the bridge of the carriage and affords a solid and substantial bearing directly under the tool post. The cross slide is exceptionally wide and heavy and the compound rest very substantial. Both slides are equipped with taper gibs for adjustment, which adjustment requires the use of one screw only. Graduated index collars are supplied for both the cross slide and the compound rest. The rack is of steel, cut in one piece.

The apron is long, wide and thick, and is very rigid, being well provided with braces throughout. It is tongued and grooved into the carriage and is securely bolted to it. All pinions and gears subject to considerable strain are of steel. All studs throughout are of steel, hardened and ground, except where bronze bushings are provided. There is a reverse in the apron, together with a safety locking device for the half nut. The chasing dial, referred to before, may be seen at the right of the apron. The dial is graduated to indicate the rotation of the lead screw and enables the operator to throw in the nut at the proper moment, permitting him to return the carriage quickly by hand and thus resulting in a considerable saving of time and effort.

A double friction countershaft is furnished, with large and powerful driving pulleys. All wearing surfaces on the clutch are ground. The bearings are self-oiling by the use of a ring and are of pressed steel, together with the hangers, making them very strong for their weight. All exposed gears are encased with guards.

The equipment furnished with the machine includes a compound rest, complete set of change gears, large and small face plates, steady and follower rests, countershaft and wrenches.

The Standard Nipple & Tool Company.—As a result of the reorganization of the Standard Nipple & Tool Company, West Newton, Pa., and the building of a new plant the company is now turning out first-class products and is prepared to serve the interests of its customers most advantageously. The new plant has been specially designed for the manufacture of nipples and pipe fitters' tools, being equipped with the latest improved automatic nipple cutting and threading machinery, galvanizing fa-

cilities by the hot process, and special machinery for the manufacture of the duplex pipe wrench and other pipe fitters' tools. The location of the plant at West Newton, on the main lines of the Baltimore & Ohio and the Pittsburgh & Lake Erie railroads, with good transfer connections to the Pennsylvania and other railroads, affords excellent shipping facilities. The company makes nipples from $\frac{1}{8}$ to 12 in., inclusive, and has a capacity of 2,000,000 nipples and 2000 wrenches per month.

Submarine Trials.

Recently in Provincetown Bay on the Massachusetts coast a number of submarine boats built by the Fore River Shipbuilding Company, Quincy, Mass., were given a series of interesting trials. One of the largest of these, the Stingray, remained under water for about five hours, and at a submergence of 15 ft. made a speed of 9.5 knots an hour. The deck of this vessel, mounted on the hull proper is about 5 ft. wide by 60 ft. long, and is perforated to facilitate its sinking and raising. At the center of this deck is the conning tower about 5 ft. high through the bullseyes in which and with the aid of the instructions of the man at the periscope, the pilot steers his course. There are two periscope tubes in front of the conning tower which rise some 20 odd feet above the deck.

When cruising on the surface the boat is driven by gasoline engines, and at the same time storage batteries are charged so that for the submerged runs electric motors may be used for the propulsion. The running under the latter conditions is extremely smooth and without vibration, and as there is then no wash of water against the sides of the boat, it is said, to be difficult to realize that the boat is in motion. The navigating bridge used when on the surface and the guard rails are stowed below when the vessel prepares to dive, the manhole is closed and made tight, and then water is let in to the main ballast, and the forward and stern trimming tanks until the vessel is about 5 ft. under the surface. Then the motors are started and the diving rudder set to still further deflect the boat. One operator stands constantly at the control of this rudder and watches the depth gauge to keep the proper submergence. The handling of the rudder is especially delicate; a deflection of about 5 degrees is all that is used for diving and on level sailing it is kept at an angle of about $1\frac{1}{2}$ degrees, as the tanks are filled to leave a reserve buoyancy of about 1000 lb. The submarine has twin screws, with a gasoline engine and a motor for each, and at the forward end are two torpedo tubes.

The mile course over which the trials were made was parallel with and about a mile and a half off shore, and the start, finish and quarters were marked by pairs of ranges set up on shore. On board the boat and on shore the time was taken each time the vessel passed one of these marks. Twelve runs at different speeds were made, ranging from the maximum of $9\frac{1}{2}$ knots to about 4 as the minimum.

The Quick Unloading Car Chute.

For contractors' use as an accessory in the saving of time to dumping wagons for unloading, the Quick Unloading Car Chute Company, Birmingham, Ala., now offers a device for loading wagons from cars. It is a simple device, the nature of which will be at once comprehended from the illustrations. Fig. 1 shows one of the chutes discharging, and Fig. 2 a wagon loaded ready to be hauled away. The advantages that come from the

three different points, according to the size of wagon to be loaded. Depending on the relative heights of the car sides and the wagons, the chutes are adjusted with a chain, by the hooking up of which the front of the chute is raised, while by letting it down the chute is given a greater inclination. It is necessary to fit the hooks securely to the top edge of the car and not let the ends rest on the contents of the car. If the car is full of material a space should be cleared for the ends of the hooks. The curved part of each hook must be in close

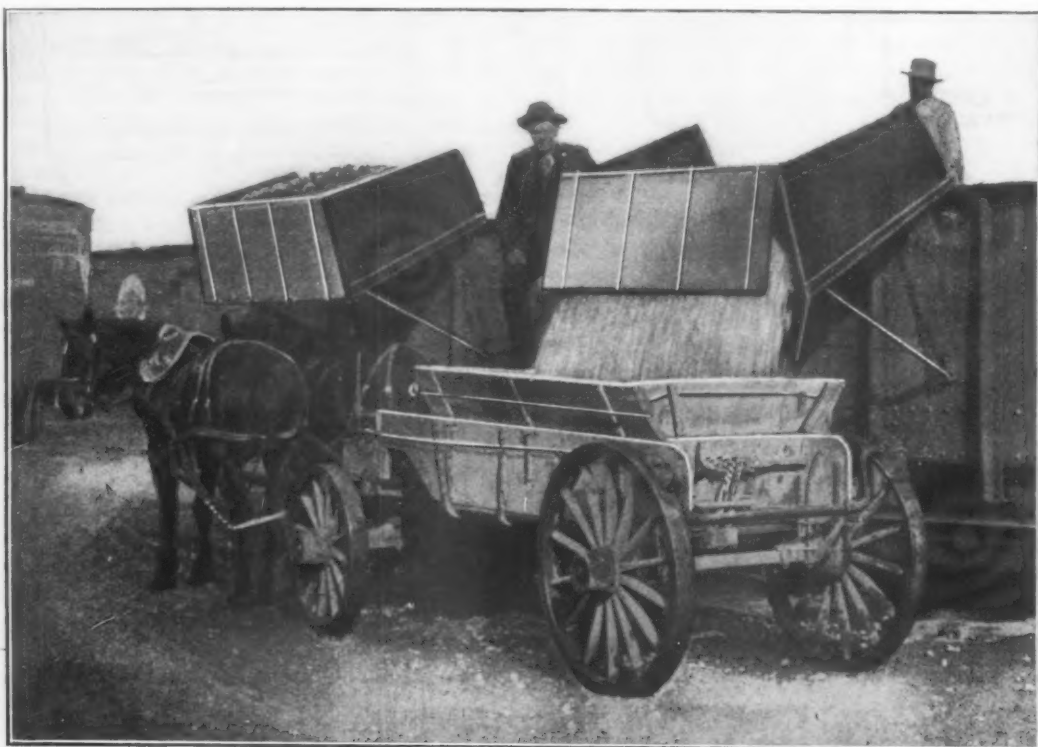


Fig. 1.—A Device for Loading Wagons from Cars, Made by the Quick Unloading Car Chute Company, Birmingham, Ala.



Fig. 2.—A Wagon Completely Loaded from the Contents of Two Chutes.

use of this chute are that it saves the team from waiting while the shovelers in the car do their work and it enables them to work continuously instead of waiting for the arrival of a team. There being no waiting for the wagons, or wagons waiting for loads, it is claimed, and it would seem quite conservatively, that by use of the chutes one-third more work can be done with a given number of teams.

Fig. 3 gives the best idea of the construction of the chute. It is made of sheet steel and angle iron and is hooked to the top of the car with two large hooks, which may be attached to the bottom frame of the chute at

contact with the edge of the car. If these precautions are taken the chute will sustain double the rated capacity easily.

The chutes are made in three sizes—for coal, 1, $\frac{3}{4}$ and $\frac{1}{2}$ ton, and for crushed rock, sand, slag, brick, &c., $1\frac{1}{2}$, 1 and $\frac{3}{4}$ cu. yd. The chutes can be used on box cars as well as on gondolas. If there is a grain door the hook is applied to the top and the braces are worked against the sill of the car. If there is no grain door a 2 x 6 in. beam may be put across the inside of the door. The man in the car can always see the chute, so that he may shovel more rapidly than where he has to be careful to

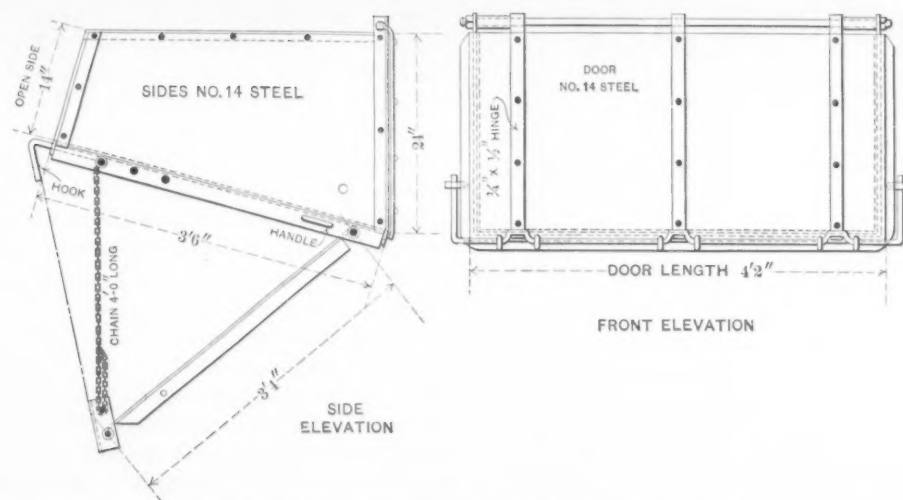


Fig. 3.—Side and Front Elevations of the Quick Unloading Car Chute.

throw the material into a wagon that is not always where he can see it. By using two chutes on a car and dividing the distance the shoveler can unload the car without moving the chute. Two men can easily handle one of the chutes. By carrying it to the car in the wagon and setting it down with the hooks up and taking a short lift the hooks may be placed over the top of the car; then adjusting the braces makes it ready to be filled. When a car is empty the chute may be transferred to a loaded car by placing it on the last wagon load and letting the team draw it along to the next car.

The loading of a wagon in the usual way from a car may take as much as 30 min., whereas with this chute the wagon will be retained only one minute, and can then start on its return trip. If extra large wagons are used, holding more than $1\frac{1}{2}$ cu. yds., the contents of two chutes can be placed in each wagon, as was done in the case illustrated in Fig. 2. Complete loading of a team under such circumstances is accomplished in about 3 min. after reaching the car.

The chutes are adapted to handle any kind of material that can be shoveled, such as road making material, sand, coal, coke, ore, crushed stone, gravel, clinders, ashes, slag, earth, hard brick, &c. The driver of the team adjusts the bolt, which locks the door and discharges the load from the chute into the wagon, then leaves the door relocked again, ready for the chute to be reloaded. A 1-ton chute for coal or a $1\frac{1}{2}$ -cu. yd. chute for sand, rock, &c., weighs 325 lb. The intermediate sizes weigh 275 lb., and the smallest size, $\frac{1}{2}$ ton for coal or $\frac{3}{4}$ cu. yd. for sand, 250 lb.

Some of the Mesta Machine Company's Orders.—

Among orders recently placed with the Mesta Machine Company, Pittsburgh, are the following: Standard Steel Works, Burnham, Pa., two 24 x 36 in. four-valve engines and one 42-in. mill for rolling tires; Buffalo Union Furnace Company, Buffalo, N. Y., one Helander barometric condenser to take care of its four blowing engines; Salem Iron Company, Leetonia, Ohio, one 72-in. barometric condenser; Tennessee Coal, Iron & Railroad Company, Ensley, Ala., one 84-in. and one 132-in. Helander condenser, to take care of all its blowing engines. A noteworthy feature about the last-mentioned condenser is its immense size, for on completion it will fill a railroad car, and is said to be one of the largest, if not the largest, ever made in this country. The company has also secured a contract from the Steel Car Forge Company, Butler, Pa., for an all-steel motor-driven shear, which will cut hot slabs 6 in. thick by 48 in. wide, this being one of the largest shears of the kind ever constructed.

The Saugus River Peat Company, Lynnfield, Mass., received a number of peat expert visitors recently who took advantage of the opportunity of inspecting the workings of the company's experimental plant while they were in the vicinity attending the sessions at Boston of the American Peat Society. Manager E. Curtis Mc-

Kenney is stated by the *Wakefield Daily Item* to have carried on a series of successful experiments in the manufacture of a suitable peat fuel for use in gas producer work and under boilers. The company proposes to begin the production of peat coal and peat products for other purposes on a commercial scale early in 1910.

The Tower Gas Engine.

Unlike most gas engines of the single-acting type, the valves in a line of multicylinder vertical engines now being introduced by a new gas engine manufacturer, the Tower Engineering Company, Buffalo, N. Y., are operated by eccentrics and wiping rockers instead of revolving cams and rollers. The engines are of four-stroke cycle type, have long trunk pistons and the valve gear shaft is placed in a housing extending along one side of the tops of the cylinders. The exhaust valve is water cooled and the cylinder water jacket has ribs at the bottom. Solid poppet type inlet valves, set in removable cages, and hollow mushroom type exhaust valves are used. Just over the main inlet valve in each cage is a piston mixing valve.

While the method of governing is to reduce the gas supply and increase the air supply to prevent an increase of speed with a decrease of load, and vice versa to maintain the speed when the load increases, it has this difference from usual arrangements, that it does not maintain constant compression, as the air supply is more than proportionately increased with a given reduction of gas supply, so that at light loads the compression is actually higher than at full load. The advantage is that there is less chance of failure of the charge to ignite when the mixture is lean. Separate headers are provided for the air and gas along the cylinder heads so that they do not mix until reaching the inlet valve cage. Spiral ribs on the interior of the mixing valve impart a whirling motion to the gas and air which tends to mix them more thoroughly. The make-and-break ignitor has the novel provision of duplicate plugs either of which can be turned into operating position if the other becomes fouled or otherwise rendered inactive. A spiral rib on the interior of the water jacket increases the effectiveness of the circulation of the cooling water. Positive lubrication is provided from a force feed pump through pipes to all of the bearings.

The engine is started by compressed air controlled by a distributing air valve actuated by special cams mounted on a sliding sleeve. To start the engine this sleeve is shifted by a lever that at the same time opens a master valve in the main air supply and air is admitted to the cylinder that is on its working stroke. When another cylinder which has drawn in its charge explodes it, the higher pressure in that cylinder closes a check valve and excludes admission of further starting air, and the sliding sleeve is restored to idle position which simultaneously closes the master air valve.

THE IRON AGE

Established in 1855.

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High Prices and the Export Trade.

The presumption has been strong that the diminution in our exports of foodstuffs has been due to the high prices at which these products are selling in all domestic markets. A statement just issued by the Bureau of Statistics of the Department of Commerce and Labor takes a different view, claiming that the decrease in exportations is apparently due to the fact that domestic consumption is growing more rapidly than production. It points out that the share exported of the wheat and corn crops of the United States has been materially less since 1903 than at any time during the 20 years immediately preceding that date. In the 20-year period from 1883 to 1903 the share of the wheat crop exported ranged from 40 per cent. downward, but in only two years did it fall below 26 per cent. Since 1903 the share of the crop exported has been much smaller, ranging from 20 per cent. in 1907 to 8 per cent. in 1905. Although last year's wheat crop was so large that it had been exceeded on only five occasions in the history of the country, the share exported was but 17 per cent. Corn and meat exportations have shown a corresponding decline.

The publication of this statement will undoubtedly provoke not only discussion of the underlying facts but also an analysis of other causes than increasing domestic consumption as responsible for the diminishing exports of food products. While the prediction has often been made that the time is approaching when the United States will cease to be one of the chief sources of supply of food to the countries unable to meet their own requirements, the array of statistics above referred to will hardly be accepted as a conclusive demonstration that the long expected equilibrium of American production and consumption is at hand. When the enormous stock of wheat in farmers' hands so recently as the spring of 1907 is considered in connection with the fact that the exports in the following months were not extraordinarily heavy, it would seem that the theory of the Bureau of Statistics is not incontrovertible. Possibly, the maintenance of our prices at a level somewhat above the parity of other food exporting countries, which have so largely increased their production in the past 25 years, may have considerable influence in deterring purchasers of our wheat by foreign nations.

It is increasingly evident that the general level of prices in this country is becoming altogether too high for the maintenance of an export trade except in commodities imperatively needed by other countries or on which special export prices are made. This is observable

as well in manufactured products as in foodstuffs and other lines. That prices have been kept on too high a plane in this country has probably had as strong an influence in causing our exports to shrink in the past year or more as the trade depression in foreign countries. It is apparent, in view of our great volume of imports, that the continuance of high prices here will work havoc in the favorable balance of trade to which our business interests have so long been accustomed. The adjustment of international accounts to an opposite condition of affairs may have in it no immediate menace, but the time may come when it will prove embarrassing and present a problem calling for solution. We are fast getting too far out of line with the rest of the world with regard to the cost of living, and unless this is corrected it will bring its own penalty. It is probably too much to expect that other countries with which we are trade competitors will advance their prices to our standard.

Shippers in the Dark Regarding New Demurrage Rules.

An unfortunate incident has marred the progress of the new code of car demurrage rules which is being promoted through the National Association of Railroad Commissioners. A sub-committee of commissioners, with Franklin K. Lane of the Interstate Commerce Commission as chairman, held a meeting at Chicago recently to formulate and agree upon a definite draft of the proposed national code of rules. Several representatives of the railroads, including their leading experts on demurrage or car service, were present at this meeting and took part in its deliberations, but it is understood that no representatives of shipping interests were invited. After the report had been agreed upon it was submitted to the full committee and was adopted with a few modifications. The members pledged themselves to secrecy regarding its provisions, until the proposed code is submitted to the National Association of Railroad Commissioners at Washington, November 16. The railroads, through their experts who assisted in compiling the code, have full knowledge regarding its provisions, while the shipping interests of the country are kept in the dark.

Business men will generally concede to railroad officials the right to hold private meetings, within legal limits, for the consideration of questions regarding the management of their property. Freight cars belong to the railroads and represent a very large investment of capital, and this property requires the very highest ability in its management to insure proper financial returns to the owners and proper service to the public. Railroad commissioners, however, are public officials, representing the national and State governments, and the laws creating them contemplate that they shall be impartial in their public duties. In fact, the chief purpose of these laws has been to protect the unorganized public against possible abuses of the great corporate powers which railroad companies possess. Cases might arise where it would be proper for commissioners to take a complaining shipper into their confidence, without publishing to the railroads any details regarding contemplated proceedings; but protesting shippers declare in regard to the recent action on demurrage rules that it is improper to give the railroads knowledge which is denied to shippers or the public regarding the proposed code.

The railroad officials who were present at this conference were Arthur Hale, demurrage and car service expert of the American Railway Association; President

Delano of the Wabash Railroad, C. W. Sanford, manager of the Chicago Demurrage Bureau, and J. C. Haskell of Atlanta, Ga., manager of the Southeastern Demurrage Bureau. Arthur Hale is chairman of the Car Service and Car Efficiency committees of the American Railway Association. This association initiated the standard code of demurrage rules, which was adopted last year by the various district bureaus of the railroads.

Chairman Lane, when asked why railroad men were present at the meeting of so important a committee, explained that it was customary to ask their attendance at such conferences. It is true that there has been such a custom. When the Interstate Commerce Commission began the administration of the Hepburn law, three years ago, it privately invited the assistance of an Advisory Committee of railroad officials in preparing its voluminous code of regulations. This committee consisted of one expert from each of the important district traffic associations of the railroads, and the ideas which they injected into the regulations published by the commission are held responsible by many shippers for a vast amount of friction and trouble which shipping interests have experienced under the Hepburn law. No instance comes to mind of experts representing shippers or associations of shippers being invited to assist the national commission in this manner.

Among other provisions which it is understood are embodied in the new code is the "Philadelphia average" rule. Under this rule a shipper or consignee who takes 48 hours to load or unload a car is charged with one day of demurrage. If he releases a car in 24 hours he is given credit for one day. To come out even on two cars it would be necessary to release one in 24 hours and the other in 48 hours, and to gain any advantage or credit, to be applied on cars held more than 48 hours, it is necessary to release in 24 hours more than half of the total number handled. The only shippers who can "break even" under this plan are a few who handle special commodities, like grain, which can be loaded or unloaded quickly by machinery. The railroads in the Philadelphia District found that this provision was of no value and several years ago they adopted the Pittsburgh "industrial rule" to meet the necessities of the large industries east of the Alleghenies which work under the Philadelphia bureau.

It is expected that the new code will be given the effect of a legal enactment throughout the United States by the joint authority of the Interstate Commerce Commission and the various State railroad commissions. It is very important that the public and the shipping interests of the country should be given full knowledge of any such proposed exercise of the authority of commissions. Shippers' organizations could doubtless make valuable suggestions. The meaning of one word, or a change of a word, in a code of this national character may make a vast difference in the rights of shippers, working a hardship to many industries which it would be almost impossible to correct in legislation of so formidable a character.

President Taft announced in a speech at Seattle, Wash., September 30, that he would urge in his coming message to Congress the enactment of a ship subsidy law. He declared that the country was ready to make such an experiment and that something must be done to build up an American merchant marine. His utterances on this subject were received with great applause by an audience said to be the largest he has faced since the beginning of his tour.

The Automobile Industry Affecting Wages.

The influence of the automobile builders in raising the general standard of wages in the machinery and allied industries has been brought home to a great many employers of labor during the process of increasing working forces which is now going on. The impulse which sends the labor market upward originates largely with the great plants that employ a high percentage of skilled labor. They absorb the surplus idle men and then seek for men wherever they are available. Offers of higher pay in such special cases exert an irresistible influence toward a general advance. The automobile industry has come to be the greatest factor of all in this connection; it is felt the more because the plants have increased enormously during a period when most lines of manufacture were experiencing poor business and were compelled to lay off large portions of their forces.

The great movement of skilled labor is toward the Middle West. In the East there is general complaint that the Western inducements offered employees are so attractive that they are migrating by the hundred. Young men especially show eagerness to embrace the opportunities opened to them. There is difficulty in retaining the services of apprentices when they graduate into journeymen; they are leaving the machine tool builders in almost disheartening numbers. In some cases the higher prices are met, in order that shop organizations may not be too seriously disturbed. In others the attempt is held to be useless. The successful automobile manufacturer has achieved his position in the trade largely through the excellence of his product. This he must maintain, and it can be accomplished only by keeping up a high standard of workmanship. He must have the men. If other employers meet his prices he must raise the figure. Therefore there is good reason in many instances for not trying to keep men who have been approached with offers of more liberal wages than their employers can afford to establish. The automobile people who are expanding the most rapidly have probably made very large profits and can afford to pay extravagant wages in order to retain their reputation as manufacturers and the earnings which go with them.

This condition, it is expected, will tend toward higher prices for the product of the machine shops. The machine tool industry is now suffering from the combination of a scarcity of help and higher prices for labor. There seems to be no alleviation of the condition except in increased concentration on the development of specialists, by the training of unskilled men to do some one work well, and a combined effort, through apprentice systems and industrial schools, to provide for a future in which good men will be available in numbers better proportioned to the demand.

The Bureau of Statistics of Massachusetts has just published figures which illustrate the different wage conditions as they exist in the industries, two of the headings being "automobiles" and "foundry and machine shop products." Unfortunately the figures are for the dull year of 1908, which was not a happy one, and make a legitimate comparison impossible. The automobile business was excellent, while the foundry and machine industries were dull. But, on the other hand, the automobile people were able to get the best of men at wages below the present market, and while foundry and machine shop help is probably as well paid in Massachusetts as anywhere, taking the average, wages in the automobile plants of the Middle West are higher than in those of the New England States. Other corrections may have to be

taken into consideration. But the fact that the average yearly wage paid by the automobile industry in Massachusetts was 25 per cent. greater than in the machine shops and foundries, as a whole, is significant. Thirteen automobile factories, with \$3,216,000 of capital devoted to production, paid \$1,223,000 in wages to an average payroll of 1627 persons, making an average annual earning of \$752.11. The value of the product was \$5,443,000, and that of stock and materials consumed was \$1,526,000. Thus the net profit, above labor and material, was \$2,693,000, or 49 per cent. The percentage of wages to capital was 38. The manufacturers of foundry and machine shop products to the number of 519, with capital of \$60,525,000 devoted to production, paid \$18,699,000 in wages to an average payroll of 31,112 persons, making an average annual wage of \$601. The value of product was \$56,208,000; that of stock and material \$20,791,000. The net profit above labor and materials (not including overhead expense, of course) was \$16,716,000, or 30 per cent. The percentage of wages to capital was 30. A comparison of these figures affords good reasons why the automobile industry can afford to pay high wages; in fact, why it has to pay them, if they are required in order to get the best labor possible. If the machine tool builder and others resent the presence of this new competitor for labor, the consolation must always be kept in mind that the automobile is the best customer that has made its appearance in years.

New Sides to Workmen's Compensation.

The development of the workings of the workmen's compensation act, the British counterpart of our employers' liability act, is of interest in this country, where there promises to be a need of some amendment to the present laws governing the payment of damages to employees. The British act provides that the employer shall pay to the injured workman or his dependents, in case of his death by accident, certain damages regulated on the basis of his wages. The amounts do not approach the usual jury awards in American employers' liability cases, but, on the other hand, while the employer here is legally blameless where the accident results from the negligence of the victim or of his fellow workman, in Great Britain the question of negligence does not enter into the case, except where the accident is caused by the "serious and wilful misconduct on the part of the workman." This feature of the law is comparatively new, and the decisions so far rendered have been watched keenly by all interested persons.

An English textbook defines "serious and wilful misconduct" thus: "If a workman does something which he ought not to do, or omits to do something that he ought to do, he may be guilty of negligence, or possibly of misconduct, but that in itself is not sufficient to disentitle him from compensation. The word 'wilful' imports that the misconduct must be deliberate, and not a thoughtless act done on the spur of the moment. It is not the act itself, but the wrongful element in it that must be wilful." In one case, workmen riding with others through a mine tunnel on the top of a loaded car, a practice prohibited by regulation, was killed by a stone which fell from the tunnel roof. The fact that the men on the car did not cause the fall of the stone led the court to decide in favor of the dependents of the deceased on the ground that the injury was not attributable to his misconduct, as there was no casual relation between his misconduct and the injury he had sustained.

In another case, the special rule of a mine imposed upon the miner working at the coal seam bottom of the mid-working, the duty of keeping the gate which fenced off the working of the shaft closed until the cage had been brought to the level of the working and had come to a standstill, so that it might be safely entered. The miner opened the gate before he had ascertained that the cage had been brought to the level, and assuming that the cage was there pushed his car forward. It fell, and he with it, and he was injured. The court has decided that this was serious and wilful misconduct. Failure to profit by the warning of another workman may also come under this head, according to the decision in a recent case. A miner going along a main haulage line, in which at intervals were manholes for safety, was warned by a fellow workman in one of them that the cars were not far off. The warning was unheeded, and after passing several manholes and failing to take advantage of them he was overtaken by the train and killed.

The whole system of workmen's compensation seems foreign to American institutions. Yet the burden imposed, even where only most unusual circumstances relieve the employer from liability, may be no more onerous than an employers' liability law when juries are not always open minded and fair.

CORRESPONDENCE.

The Largest Pig Iron Output for a Day.

To the Editor: There is an error in the statement in *The Iron Age* of September 30, page 999, that one of the Duquesne furnaces holds the record for the best day's output of pig iron; namely, 832 gross tons. As far back as June, 1902, Furnace E of the Edgar Thomson group made 901 gross tons. Later, on March 30, 1905, the same furnace made 918 gross tons of Bessemer pig iron in 24 hours. This was the world's record then, but it may have been exceeded in the intervening years. In March, 1902, the No. 1 stack of the then National Steel Company, at Youngstown, Ohio, made 19,734 tons of pig iron, or an average of 636 tons daily. I believe this is the best daily average for a month.

Latterly it would seem that the efforts of blast furnacemen have been directed to the making of good monthly records rather than to spectacular performances for a single day. The methods by which remarkable 24-hr. runs are secured are so well known that figures for the greatest day's output are not as impressive as they seem to be.

RECORD.

PITTSBURGH, October 2, 1909.

The United States Geological Survey has issued a report on the production of iron ores, pig iron and steel in 1908, published as an advance chapter from "Mineral Resources of the United States, Calendar Year 1908." This report contains a map showing the distribution of iron ore in the United States, compiled by E. C. Harder, and another showing the location of blast furnaces in the United States, compiled by W. T. Thom. It is now ready for distribution and can be had on application to the Director of the Geological Survey, Washington, D. C.

W. E. Kennedy, until recently with the Contractors' Machinery & Supply Company, and J. S. Hunter, formerly of the erection department of the Pittsburgh Steel Construction Company, have formed the Pittsburgh Machinery & Equipment Company, 815 Fulton Building, Pittsburgh, to deal in new and second-hand machinery of all kinds, making a specialty of contractors' equipment. The company has a storage yard at Aspinwall, near Pittsburgh, and yards and warehouse at Economy, Pa.

The Sweet's Steel Company, Williamsport, Pa., is now turning out light steel rails in 12 to 25 lb. sections.

OBITUARY.

LEWIS C. GROVER, Hartford, Conn., chairman of the board of directors of the Colt's Patent Fire Arms Mfg. Company, died September 30, after a long illness, aged 59 years. He was born at Springfield, Mass. After ending his studies in the common schools he served an apprenticeship as a machinist, and immediately became foreman of the works of the Norwalk Iron Works, South Norwalk, Conn. Three years later he was made manager of the Whitney Arms Company, New Haven, Conn., which position he held for six years, until 1886, when he began his career with the Colt's Company as assistant superintendent. He was soon promoted to superintendent and later to the office of general manager. In 1902 he was elected a director and president of the company, to succeed the late John H. Hall, at the same time becoming president of the Colt's Company, New York. Because of ill health he was finally compelled to relinquish to others the active duties of the management, and in January last resigned the office of president, the same meeting making him chairman of the boards of directors of both corporations. Mr. Grover combined to an unusual degree the qualities of management with a highly developed mechanical mind. He was a member of the American Society of Mechanical Engineers. Prominent in the public affairs of his city, he served in the city government and for years on the Board of Park Commissioners, of which he was president for several years. He leaves a widow and one daughter.

GEORGE A. ROLLINS, Nashua, N. H., president of the Rollins Engine Company, died September 30, aged 82 years. He was a native of Dedham, Mass. He learned the machinists' trade at Manchester, N. H., then removed to Nashua, where he founded the business which bears his name. The Rollins steam engine attained a high degree of development under his direction. He was a director of the White Mountain Freezer Company of Nashua. He took an active part in the public life of his city.

BEN CATLEY, one of the best known traveling men and experts in steel and iron, died after a surgical operation September 30 in St. John's Hospital, Allegheny, Pa., aged 75 years. He was useful beyond the privilege of most men. His life was an exceptionally active one, beginning as a boy in the English coal mines. He saw service in the Crimean War, followed by over half a century with Pittsburgh mills, some of which have long passed out of existence. His earlier experience was with Reese, Graff & Woods, prominent in iron over 40 years ago. He was Government inspector of material and manufacture of ordnance at the Fort Pitt Foundry during the Civil War. He was later with Graff, Bennett & Co., and was associated with Robert Anderson, one of the pioneers in steel making and founder of Anderson, Dupuy & Co., now part of the Crucible Steel Company of America. He represented for many years the Carbon Steel Company, and for over 15 years, and until his death, was with the Zug Iron & Steel Company, serving the last two years in the capacity of manager of the bar department. Although his early life lacked school advantages, his desire to learn and his serious temperament made him a constant student, and his fine library of standard books and his frequent contributions to scientific and industrial journals and to the daily press testify to his mental ability and activity. He was a man of deep-seated religious conviction, and on frequent occasions ably filled the pulpit of his own and other churches. He was actively at work up to a few days before his death. He leaves a widow, three sons and two daughters.

KENNETH ROBERTSON, a prominent blast furnaceman, died at Portland, Ore., September 26, aged 62 years. He was long identified with the Sloss interests in Birmingham, Ala., also with the Duluth Furnace Company in Minnesota, and the Pardee interests in New Jersey. He was born in Madison County, Ala., and enlisted in the Washington artillery of the Confederate Army, and served until captured by the Union forces. He was confined in the Federal prison of Camp Chase near Colum-

bus, Ohio, until the end of the war. Shortly afterward he entered the School of Mines of Columbia University, New York, and graduated with honors, later following this training by opening one of the first chemical laboratories in Pittsburgh with his brother, Richard Spotswood. In 1904 he was stricken with paralysis while in charge of blast furnaces at Rockhill, Pa. He leaves a widow, two daughters and two sons, Kenneth, Jr., and Philip Spotswood.

SYLVANUS BOURNE, president and treasurer of the Bourne-Knowles Mfg. Company, Cleveland, maker of nuts, rivets, &c., and for many years prominently identified with metal working industries in that city, committed suicide by shooting himself in his office September 30. The cause is supposed to have been despondency due to ill health. He was born in Wareham, Mass., in 1847. He moved to Cleveland about 30 years ago, and has been associated with the Bourne-Knowles Company since that time.

EDWARD T. COE, for almost his entire lifetime identified with the Coe Brass Company, Torrington, Conn., as treasurer, died, October 5, at his home in New Haven after a long illness, aged 61 years. He leaves a widow.

Southern Iron & Steel Company Reconstruction

The Trussville, Ala., furnace of the Southern Iron & Steel Company has been relined and is now being dried out. It will probably be put in blast by the middle of October, being the first furnace of the company to be blown in. The Chattanooga furnace is being relined and may be ready for blast by October 25. The blast furnace at Gadsden is partly relined and will be ready for blast in November. However, this furnace will not be needed until the open hearth steel plant at Gadsden is ready for operation. A double concrete tunnel is being built under the stock bins at the Gadsden furnace and an electric haulage system from the bins to the skip pit is being installed. The bins and trestles are to be entirely rebuilt. The four open hearth furnaces are being overhauled and the plans heretofore made for the building of a fifth and a sixth furnace will be carried out. Excavation and foundation work are under way for the new wire rod, wire and nail mills in connection with the Gadsden plant. The wire mill will be of brick, with steel truss roofs supported by latticed columns. The rod mill will be of steel frame work.

A contract has been awarded to the McClintic-Marshall Construction Company, Pittsburgh, for the removal from Ensley and the re-erection at Gadsden of the old rod mill building. This company has a contract also for the construction of the new wire mill and nail mill buildings, warehouses, &c. The wire and nail mill machinery will be driven by electricity, the Crocker-Wheeler Company having the contract for the generator, motors, &c., and a telferage system will be installed at these mills. Various other contracts have been awarded, as follows: Babcock & Wilcox Company, 40 40-hp. Stirling water tube boilers; Harrison Safety Boiler Works, 5000-hp. heater and purifier; Buckeye Engine Company, two 14½ x 26½ x 21 in. cross compound direct connected engines for the electric plant; Alex. Laughlin & Co., Pittsburgh, three continuous reheating furnaces; National Machinery Company, Tiffin, Ohio, 100 wire nail machines; Humphrey & Son, Joliet, Ill., wire drawing machinery.

Record Iron Ore Output at Port Henry.—Witherbee, Sherman & Co. have begun the erection of a third separating plant at their Harmony mines, Mineville, N. Y. It will have a capacity of 1600 tons of ore in 20 hr. The equipment will be electrically driven, current being supplied from the company's electric power station at Port Henry, N. Y., 6 miles distant. September was a record month for shipments from the Port Henry District iron mines, the total being 72,339 tons.

McCoy & Brandt have removed their offices from the sixth floor of the Ferguson Building to room 410 House Building, Pittsburgh, where they have secured better quarters to conduct their business in new and second-hand machinery.

The "Growth" of Cast Iron After Repeated Heatings

Recent Investigations in Great Britain, With Comments by A. E. Outerbridge, Jr.

At the meeting of the Iron and Steel Institute in London, September 27 to October 1, a paper was presented by Prof. H. F. Rugan and Prof. H. C. H. Carpenter, on "The 'Growth' of Cast Irons after Repeated Heatings." The subject is familiar to the students of developments in cast iron in the United States through the extensive investigations of A. E. Outerbridge, Jr., Philadelphia, the results of which were presented by Mr. Outerbridge in papers before the American Institute of Mining Engineers, the Franklin Institute and other engineering and scientific organizations. Professor Rugan has the chair of mechanic arts at Tulane University of Louisiana, but is now prosecuting work as a research fellow in metallurgy at Victoria University, Manchester, Eng. Dr. Carpenter is professor of metallurgy at Victoria University. Their paper consists of 101 printed pages, and is accompanied by plates and diagrams. They take issue with Mr. Outerbridge on some points, but as will be seen later Mr. Outerbridge takes the position that the Manchester investigations are clouded by causes of error which were avoided in his own experiments. While Professors Rugan and Carpenter have done a vast amount of work and have given interesting details of it, they present no specific gravity determinations and no breaking tests, and a number of their suggestions were anticipated by Mr. Outerbridge. Their reference to the fact that gases play an important part in the growth of various alloys was anticipated by Mr. Outerbridge in a paper published in the *Journal of the Franklin Institute* for April, 1905, as well as in an article in the *American Machinist* of March 19, 1908 on "the Growth of Cast Iron."

Space is not available for more than a summary of the results and the methods followed, as presented by Professors Rugan and Carpenter. This is given by the authors in 27 paragraphs which are reprinted below. References are made to various series of alloys and to data given in the body of the paper in tabular and other forms. These references are retained in the summary as given below, even in the absence of the matter to which they refer, as their omission would make the statements less clear:

1. The conditions under which the maximum growth of commercial cast irons is brought about by repeated heatings were determined. As a result a period of four hours at 900 degrees C. was chosen for the experiments.

2. It was shown that for growth to take place both heating and cooling are required. A given specimen grows no more under a 17 hours' than a three hours' treatment.

3. Methods of measurement of temperature and volume changes were decided upon. For the former thermojunctions and a direct-reading pyrometer were used; for the latter micrometer callipers reading to 0.0001 in.

4. Test bars were heated in a cast iron muffle protected from the direct action of the flame by another muffle of fire clay.

5. Three commercial cast irons were investigated. They grew at different rates and to different extents. After 94 heats they reached a constant volume. The growths varied between 35.21 and 37.50 per cent. An increase in weight was found in all cases.

6. The first step consisted in an attempt to correlate growth with chemical composition.

7. Iron Carbon Series of Alloys Containing No Graphite.—The carbon ranged between 4.03 and 0.15 per cent. Other constituents were low and constant. (Eight alloys, B to I.)

A. Sand Cast Alloys.—White irons. The final result after 39 to 78 heats was a permanent shrinkage in all cases, which in six out of eight cases was not more than 0.5 per cent. A diminution in weight was found in seven out of eight cases, which followed nearly the same order as the carbon.

B. Chill Cast Alloys.—White irons. The results were similar to those obtained with the sand cast alloys, although the permanent shrinkage was not so fully marked.

8. The results obtained under 7 have given the authors the solution of the practical problem, viz., the finding of an alloy whose volume remains constant even after

repeated heatings at about 900 degrees C. Such an alloy would be a white iron with about 3 per cent. of carbon, and only small quantities of other constituents of which for this purpose silicon is the most important and should not exceed about 0.2 to 0.3 per cent.

9. High Carbon Medium Silicon Series (J. K and L), Containing Small Amounts of Graphite and 0.5 to 0.8 per cent. of Silicon.—These alloys grew from the outset, and reached their maximum growth in 50 to 60 heats. The bar with the lowest silicon showed the smallest, that with the highest silicon the largest growth.

10. Two initially white irons, A and M, contracted for a certain number of heats and afterward grew. It was shown that both these irons became gray on heating, and the change from shrinkage to growth was shown to coincide with the appearance of free carbon (temper carbon); and in the case of M as the free carbon increased, so did the growth. Free carbon, whether graphite or temper, was thus proved to be an indispensable factor in the growth of cast iron under these conditions.

11. It was shown by calculation with existing data, which are, however, not very satisfactory, that the growths of A and M observed may be accounted for by an expansion consequent on the deposition of temper carbon in accordance with the equation:

Iron carbide (Fe_3C) = Iron (3Fe) + temper carbon (C) (pp. 46 to 47).

12. The influence of silicon was next tested.

Iron-Carbon-Silicon Series.—Alloys, N to S. Carbon, 3.4 to 3.98 per cent.; silicon, 1 to 6 per cent. in steps of 1 per cent. Other constituents low and constant. Growths of between 15 and 63 per cent. were found. It was shown that they were, broadly speaking, proportional to the silicon present and far in excess of what could be caused by the conversion of combined to free carbon. In fact they were largest in the high silicon alloys which contained no carbon combined with iron.

13. The bars tested in 12 had been machined at haphazard, some from the gate, others from risers in different positions. The rate of growth was shown to depend on the position. Bars cut from the gate grew more quickly than those cut from risers. That end of a bar nearer the gate grew more quickly than the other. The ends of some of the bars grew more quickly than the centers.

14. Bars cut from comparable positions were next tested (NN to SS series). They were all cut from the top of a riser. They grew more slowly than the N to S series, but ultimately reached about the same growths.

15. It was quite obvious from the behavior of this series of alloys that gases played an important rôle in their growth.

16. The curves of rate of increase in weight were seen to be similar to those of growth, and established an intimate connection between the two.

17. The final increase in weight followed the same order as the percentages of silicon. It was shown to be the resultant of three processes. (a) A partial oxidation of carbon which diminished with increase of silicon and became nil at 6 per cent.; (b) a probably complete oxidation of silicon, originally present as the silicide of iron, to a mixture of iron oxide and silica; (c) a partial oxidation of iron uncombined with silicon.

18. The growth of the alloys, N to S, was thus shown to be bound up with a change in the chemical condition of the silicon.

19. The gradual penetration of gases into the alloys during growth was studied microscopically in P, and the structural changes recorded. Large amounts of gas are dissolved at certain stages. Graphite is displaced from its original position—the spaces left are oxidized—and numerous small holes are formed. The structure is revolutionized.

20. Iron-Silicon Alloys.—T, U and V. Silicon, 0.65 to 2.71 per cent.—containing no graphite, were shown not to grow appreciably after repeated heatings.

21. The influence of gases on two members of the N to S series was studied. Alloy S, which grew 62 per cent. in a muffle, not only did not grow when heated in vacuo, but actually contracted slightly (0.04 per cent.). In doing so it gave up 1.11 times its volume of gas, which consisted of 87.5 per cent. hydrogen and 12.5 per cent. nitrogen. Another bar, after being heated in vacuo, until it had ceased evolving gas, was heated in a muffle and ultimately grew 67.7 per cent. It was thus shown that the growth of this alloy is entirely due to the penetration of gases, and that the gases it originally contains have no direct share in the growth. About 47 per cent. of the penetrating gases, con-

sist of oxides of carbon. They are responsible for the oxidation of the iron silicide which is so closely bound up with the growth of this alloy.

22. The more rapid growth of the ends than the rest of the bar is readily explained, as they expose more surface to the penetrating gases.

23. The more rapid growth of the end of the bar nearest the gate of the casting is connected with the fact that it contains more dissolved gas, but the cause of it is not as yet clear.

24. Alloy N, which grew 13.5 per cent. in a muffle, grew 11.1 per cent. when heated to constant volume in vacuo. It gave up 1.17 times its volume of gas, which was almost exclusively hydrogen (98.5 per cent.). As regards growth in vacuo this alloy thus furnished a complete contrast to S. The explanation suggested is that this iron, which is very close grained, does not give up all its gas on heating. Some of it remains permanently imprisoned. Its co-efficient of expansion being about 400 times that of the iron when it is liberated on heating, *e. g.*, at the surface of contact between the iron and the graphite plates, the pressure will be sufficient to produce a permanent expansion.

25. N appears to be an alloy whose dissolved gases are capable of causing a large growth, at any rate where external gases are removed.

26. The growth of N in a muffle is probably caused by the combined effect of both originally dissolved hydrogen and the penetrating oxides of carbon.

27. The research has thus disclosed, among the gray irons, alloys like S, whose growth in air on heating is entirely due to oxidizing gases penetrating their interior, and also alloys, N, where this may not be the sole agent, but where originally dissolved gases contribute to some extent to the growth.

Agencies at Work in the Growth of Gray Cast Iron.

In giving a practical illustration of what takes place in the repeated heatings of cast iron the authors take annealing ovens as an example. Their description of the phenomena is as follows:

These ovens are gray irons. They contain graphite and silicon, whose presence has been shown to be so intimately connected with growth. They also contain manganese, sulphur and phosphorus, whose influence has not been investigated, and must, therefore, be left out of account. They contain some dissolved gases, and they are exposed in practice to the direct action of flame gases, the influence of both of which has been carefully studied. They consist of four main structural constituents, which may almost be considered as three.

1. A solid solution of iron silicide in iron and manganese.
2. Graphite.
3. Some combined carbon—pearlite.
4. Phosphide eutectic.

With repeated heating 3 tends to pass into 2. Only 1 and 2 will be considered.

It has been shown that after the first heating gases have penetrated to a certain depth, and also that 17 hours' heating produces no more growth than three. A certain time is, of course, required, depending on the size of the oven, and the rate of supply of heat for the oven to acquire a steady temperature, and the volume corresponding to this. The author's view is that, although the gases penetrate to a certain depth during this period, possibly along slits existing between the graphite plates and the solid solution of silicide in iron, and through holes which exist here and there, yet they are not actually absorbed by the solid solution until the oven is cooling. During this absorption the oxides of carbon oxidize the iron silicide, in the first instance, at the boundaries of the crystals. This reaction is accompanied by growth and incipient disintegration. Minute cracks are formed. There may be a series of minute explosions, owing to the reaction between the dissolved hydrogen and the penetrating oxides of carbon. The mechanically weak graphite may be disintegrated and forced into holes originally existing in the metal. Nitrogen enters along with the oxides of carbon, and is absorbed to some extent. The net result is a slight growth of the oven by the time it has cooled to the ordinary temperature.

When the oven is next heated the furnace gases penetrate a little farther, owing to the fresh avenues opened up by the reactions just described. On cooling these reactions are repeated, and in this way more of the iron is disintegrated, and a further growth takes place. Simultaneously, if the iron is close grained, like alloy N, hydrogen and nitrogen are liberated in the interior at the boundaries between the solid solution and the graphite. Their co-efficient of expansion is so much greater than that of the solids that they exert a considerable pressure, with the result that the mechanically weak graphite is disintegrated, and appears to collect in the holes of the casting. Where the boundary between two holes consists of graphite it is destroyed by this action, and the two holes become one.

As the heats progress these changes continue. After

each heat the external gases have penetrated a little farther. Finally, they work their way right through the oven, the rate depending on its chemical composition, physical texture, &c. When this condition is reached the oven has grown to its full extent. Some of the graphite has been burnt off, all the silicide of iron has been oxidized, probably to a mixture of iron oxide and silica and some iron has been oxidized as well. The main cause of growth is the disintegration of the material caused by the oxidation of the iron silicide. In close-grained irons the pressure of dissolved gases also contributes to the growth. At the conclusion of the process, the structure has been revolutionized; the oven has lost the properties of cast iron. It has no mechanical strength, and can be sawed like a piece of chalk.

The authors have no hesitation in recommending that white irons should be tried for annealing ovens instead of gray. The most suitable composition appears to be an iron with about 3 per cent. of carbon and as few impurities as possible. Of these silicon is the most important, and should not exceed 0.2 to 0.3 per cent. This iron would probably shrink slightly on repeated heating. The reason why an upper limit of 3 per cent. of carbon is suggested is that white irons higher in carbon will tend to deposit temper carbon. Where this is the case the material will begin to grow. Even so, however, the growth will never be as much as in a gray iron. It is possible that an oven constructed of white iron may prove to be unsuitable, because it may crack on heating. Should this difficulty arise it may perhaps be overcome by modifying the design.

Comparison with Mr. Outerbridge's Results.

The authors consider that Mr. Outerbridge's view as to the cause of the growth of cast irons after repeated heatings will require to be modified in the light of the results they have obtained. Four particular occasions of disagreement are cited as follows:

1. His statement that "the increase of free carbon does not account in any way for the enlargement of the bar" was doubtless true of the gray iron with which he was experimenting; and holds for gray irons generally. But it is not true of white irons which become gray on heating, and expand in so doing. So far as existing data permit of an opinion being formed, this change is quite enough to account for the whole of the growth observed. (Alloys A and M.) The authors' experimental results with these two alloys are in disagreement with his opinion that "white iron in which nearly all of the carbon is in the combined form does not expand sufficiently to overcome the original shrinkage even after all of the combined carbon has been changed to graphite"; and conclusively show that it does.

2. Mr. Outerbridge states that his "enlarged bar (40.98 per cent.) weighed precisely the same as before treatment." The authors have great difficulty in accepting this statement, which is at variance with their entire experience. His bar was heated in an iron pipe, the ends of which were stoppered with clay, at a temperature of 800 degrees C.; that is, under conditions which permitted of the penetration of oxidizing gases, and were thus very similar to those used by the authors. In not a single one of the numerous cases examined by them did the weight remain constant. Every gray iron increased in weight, and the growth has been shown to be connected with this increase in the most intimate manner.

3. The authors' results have shown that Mr. Outerbridge's conclusion that "the astonishing change in volume is a molecular and not a chemical one, thus substantiating my original theory of the mobility of cast iron" is incorrect in this unqualified form. Their experiments connect in a very intimate way the growth of gray irons with a chemical change in the condition of the iron silicide which is invariably present.

4. His statement that "the peculiar property of cast iron of increasing in bulk under the influence of heat is inherent in the metal, and has existed for all time" is also incorrect in this unqualified form. Alloy S is an exception. Its growth has been proved to be due entirely to the action of penetrating gases.

Mr. Outerbridge's Comment.

An advance copy of the paper of Professors Rugan and Carpenter was sent to Mr. Outerbridge, and he has forwarded the following contribution to its discussion, which will appear in the *Journal of the Iron and Steel Institute*:

I am pleased that the authors should have found my original investigations of sufficient novelty and importance to induce them to devote so much time and labor to a continuation of the study. I am also gratified to note that "the authors are usually in general agreement (with me) in places where the same ground is traversed." In the few instances where opposite conclusions are drawn, I am agreeably surprised to discover that the internal evidence in the paper itself, upon which these diverse views are formed,

proves very conclusively indeed the correctness of my original statements.

On page 94, paragraph 1, it is stated that "the author's experimental results with these two alloys (A and M) are in disagreement with his (my) opinion that white iron, in which nearly all of the carbon is in the combined form, does not expand sufficiently to overcome the original shrinkage even after all of the combined carbon has been changed to graphite, and conclusively show that it does."

Remarkable as it may seem, a study of their tabulated tests, conclusively shows that it does not, as I will now demonstrate. The linear contraction or shrinkage of white cast iron on cooling from liquid to solid is about 0.3 in. per foot, as compared with about 0.125 in. per foot for ordinary gray foundry iron. The alloys "A and M" referred to were white iron bars, approximately 6 in. in length. The original shrinkage of the metal of the bars was, therefore, about 0.150 in. in each bar.

Table XXXI., page 42, states that the original length of alloy M bar was 6.1317 in.; the final increased length, after 68 heatings, was 6.2040 in., a total linear expansion of 0.0723 in., as compared with original shrinkage of the metal of this bar of 0.165 in. In other words it had recovered, after 68 heatings, a little less than one-half of the original shrinkage.

Table XI., page 19, states that the original length of bar alloy A (also white iron) was 5.9587 in.; the final length after no less than 90 heatings was 6.0870 in., a total linear expansion of 0.1283 in., as compared with the original shrinkage of 0.150 in. It then appears from these tables of expansion that in neither of the cases cited did the white iron bar expand sufficiently to overcome the original shrinkage, even after all of the combined carbon had been changed to the graphite form; and this agrees with practical experience in annealing malleable iron castings.

There are a number of other tables of tests of white iron bars, subjected to repeated heatings, in this brochure, all proving the accuracy of my statement.

In 1904 I exhibited bars of white cast iron and of gray cast iron that had been subjected side by side in a closed steel pipe to 100 heatings, in which the white bars had not increased in size sufficiently to overcome the original shrinkage, while the gray cast iron bars had not only recovered the original contraction, but had increased over 40 per cent. in cubic volume in addition thereto, without developing visible cracks.

On page 94, paragraph 2, appears the following: "Mr. Outerbridge states that his 'enlarged bar (40.98 per cent.) weighed precisely the same as before treatment.' The authors have great difficulty in accepting this statement, which is at variance with their entire experience. His bar was heated in an iron pipe, the ends of which were stoppered with clay, at a temperature of 800 degrees C., that is, under conditions which permitted the penetration of oxidizing gases, and were thus very similar to those used by the authors. In not a single one of the numerous cases examined by them did the weight remain constant."

With due deference to the experience of these learned authors, I am obliged to assert that the conditions were very dissimilar, and quite sufficiently so to account for the different effects. When I at first heated my bars in a muffle of a furnace, as did these investigators, I found that a constant stream of air passing over the white hot bars caused "scaling," due to oxidation, and this oxidation penetrated the metal in a manner analogous to the penetration of carbon in case hardening mild steels. This scaling always caused an increase in weight of the expanded bars. Throughout this paper the authors refer to this "scaling," which was a necessary accompaniment in their method of heating. I stated in my original communications that in many instances, to prevent scaling, I filled the spaces between the bars, in the metal tube in which they were enclosed, with charcoal; but even without this precaution there was sufficient carbonaceous material present to prevent scaling, and the conditions, moreover, did not permit of the penetration of oxidizing gases and were thus not similar to those used by the authors.

On page 5 I find it stated that "the authors have been in communication with Mr. Outerbridge, and understand that he still adheres to these views and that he has not published any later experiments bearing on them." I enclose a copy of the only communication of which I can find any record, or of which I have any recollection; and I was not aware that the authors were preparing a paper for publication, otherwise I would have been pleased to point out some other apparent discrepancies between opinions and facts as developed in their investigations.

I may say in conclusion that I do still adhere to my original views as set forth in my sundry communications to scientific bodies in this country on the large subject of "The Mobility of Molecules of Cast Iron," of which the growth of that metal after repeated heatings is a subsidiary branch, one which I had been continuously examining for 10 or more years before my first communication on the matter was offered for criticism of scientists and practical founders.

Steel Bars Instead of Cast Iron.

In an addendum to the above communication Mr. Outerbridge calls attention to an important fact concerning certain of the bars employed in the Manchester tests and to the statements of the authors as to results with these bars, as further corroboration of conclusions originally presented by him:

In more carefully studying the tables of tests in the paper entitled "The Growth of Cast Irons After Repeated Heatings," in which certain bars show slight contraction after repeated heatings, I am surprised to observe from the analyses that quite a number of these bars are not cast iron at all, but have the composition of steel, thus:

Table.	Carbon.	Silicon.	Mangan.	Sulphur.	Phos.
XVII.....	0.99	0.23	0.19	0.015	0.012
XVIII.....	0.55	0.182	0.20	0.013	0.014
XIX.....	0.15	0.186	0.15	0.040	0.017
XXII.....	1.96	0.215	0.20	0.013	0.015
XXIV.....	1.58	0.168	0.17	0.015	0.014
XXV.....	0.99	0.233	0.19	0.015	0.012
XXVI.....	0.55	0.182	0.20	0.013	0.014
XXVII.....	0.15	0.186	0.15	0.040	0.017

In all of my papers I have clearly shown the remarkable difference in behavior between steel and cast iron when subjected to repeated heating and cooling, one contracting and the other expanding. Thus: "Wrought iron and steel bars subjected to the same repeated heating and cooling in a closed tube, have all contracted slightly in cubical dimensions. The average contraction of such bars, after about 60 heatings in a closed pipe, is $\frac{1}{8}$ in. per foot." (See Trans. Am. Inst. Mining Engineers, Vol. XXXV., pp. 223-244, 1905.)

The same paper contains a photograph of a steel bar originally 12 in. long and resting on it a foot rule. Beneath is the inscription: "Soft steel bar, original length 12 in. Total contraction, 61 heatings, $\frac{1}{8}$ in. per foot." In the "postscript" you may find an interesting account of practical use to which this contraction of steel was put in a costly piece of work that was about to be "scrapped" and was saved.

I am, of course, much pleased to find that these tests showing contraction of steel bars corroborate my observations and statements so fully regarding the action of repeated heatings on steel, but I cannot but think it an unfortunate oversight that in the paper entitled "The 'Growth' of Cast Irons After Repeated Heatings" there should be no indication on the eight tables noted by me to show that the alloys are steel and not cast iron. Several other tables, not mentioned in my list, cannot be classified as cast iron.

The Colonial Steel Company.—At the recent annual meeting of the Colonial Steel Company, held in its offices in the Keystone Building, Pittsburgh, Charles A. Painter, of Scully, Painter & Beech, was elected a member of the board to fill the vacancy caused by the retirement of Charles M. Brown. The annual report showed that the company had done an increased amount of business over the previous year, although it had been influenced by the depression in progress during the greater part of that time. It is the purpose of the company to increase the board to nine members in the near future because of the new interests that have recently become identified with its affairs. Additional orders for its copper coated metal, including rods and composite metal of copper or brass and steel sheets, &c., have been placed recently, and preparations are being made to turn it out on a larger scale. The metal has been received in the most encouraging manner. The tool steel department is also showing increased operations, the demand now running to higher priced steels.

Alliance Cranes.—The Alliance Machine Company, Alliance, Ohio, on October 1 shipped 10 carloads of machinery from its plant. In the shipment was a 150-ton ladle crane destined for the Gary Works of the Indiana Steel Company. This is said to be the largest ladle crane ever built. Its total weight is 450,000 lb. The Alliance Company has orders for eight similar cranes. Three will be built for the Gary plant, three for the Cambria Steel Company and two for the Jones & Laughlin Steel Company. Since June 1 the Alliance Machine Company has received orders for over 100 cranes, ranging from 10 to 150 tons. The company has now enough orders on its books to keep its plant running to capacity for fully six months.

The Gayley Dry Blast in England.

Tests to Determine the Effect of Uniform Moisture.

A paper on "Uniform Moisture in Blast" was presented last week at the meeting of the Iron and Steel Institute in London by Greville Jones of the Clarence Iron Works, Middlesbrough, Eng. The author sought to answer the question whether the principal saving in fuel with the Gayley dry blast was due to the uniformity of blast or to its dryness. His experiments were conducted at the Clarence Works, two new furnaces, Nos. 9 and 10, both built in 1908, being employed. They are of the same dimensions, are worked by separate blowing engines, supplied with the same quantity of air, each has four stokes and in the tests each was burdened for foundry iron and carried the same total load. Silicon was required to be between 2.50 and 3 per cent.

The experiment was continued for four weeks, the first week being occupied in increasing the moisture up to the desired quantity. As careful observations had been made with wet and dry bulbs outside the engine house prior to the commencement of the experiment, it was agreed that it would be better not to exceed 4 grains of moisture in the aggregate.

The procedure was to connect up to the cold blast main a steam pipe from the main boiler plant and fit it

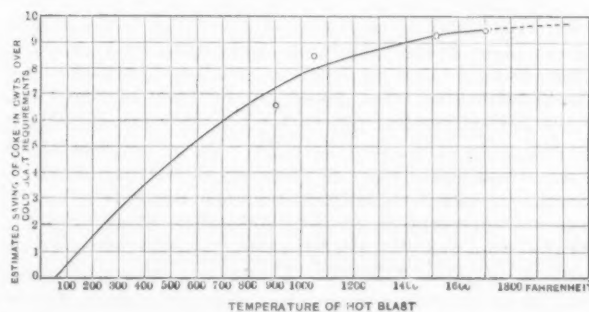


Fig. 1.—Curve of Relation Between Temperature of Hot Blast and Estimated Saving in Coke.—Approximate Position of Asymptote, Indicating Limit of Maximum Heat Saving by Hot Blast.

with a calibrated steam valve, so arranged that for a minute movement of the valve a certain quantity of steam would be admitted, representing so many grains. A pipe was also connected from the cold blast main into a wooden case, where a wet and dry bulb was hung, with, in addition, an ordinary hair hygrometer, the instrument having previously been calibrated. There was also a connection from the hot blast main to a wet and dry bulb, which gave an additional check. As a further check upon these instruments the head chemist of the works carefully took samples of both hot and cold blasts gravimetrically for five hours each day. The gases were also taken daily over the same period.

The paper gives diagrams fully plotting the results of all the observations of hot and cold blasts, and of the extent to which the steam valve was open. The average analysis of the pig iron of No. 9 furnace before the experiment was as follows: Silicon, 2.97 per cent.; sulphur, 0.037 per cent. During the experiment: Silicon, 2.76 per cent.; sulphur, 0.036 per cent. There was thus a reduction of 0.21 per cent. in silicon and 0.001 per cent. in sulphur, the latter, according to the author, being of no account, and possibly due to the slight excess of lime shown in the average slag analysis. In the case of No. 10 furnace, the silicons before and during the experiment were 2.89 and 2.84 per cent., respectively, while the sulphurs were 0.045 and 0.040 per cent., respectively. During the period that No. 9 had uniform blast no alteration was made in the burdens or temperatures of the blast at Nos. 9 and 10, and the speeds of the engines were kept the same on both furnaces. The coke consumption per ton of iron at No. 9 furnace was as follows:

	Cwt.
Four weeks previous to experiment.....	21.98
Four weeks during experiment.....	22.08
Four weeks after experiment.....	21.86

At No. 10 furnace the coke consumption was as follows:

	Cwt.
Four weeks previous to experiment.....	22.06
Four weeks during experiment.....	22.20
Four weeks after experiment.....	21.80

Tables are given of comparisons of hygrometers, composition of gas, weight of blast, heat absorption, &c., indicating the care with which the tests were carried out.

The conclusion from the tests, that the dryness of the Gayley blast is the cause of the great heat saving, is not directly stated by the author, but this together with other conclusions suggested by the test is discussed in a separate paper, presented at the same meeting. It is as follows:

Fuel Economy of Dry Blast as Indicated by Calculations from Empirical Data.

By R. S. MOORE, LONDON.

The author was associated with Mr. Greville Jones in making a test to determine the effect of uniform moisture. The results of the test points strongly to the fact that the great heat saving of the Gayley dry blast must be due to its dryness. The theoretical explanations on this basis have not been supported by any actual experimental proof, and they have apparently been as much rejected as accepted.

The principal experimental proof which is lacking is data on the saving of fuel to be secured by adding heat to the bosh. In studying the conclusions suggested by the test, it occurred to the author that this hiatus is supplied by the results of experience with the Neilson hot blast.

Fig. 1 is a curve representing the relation between temperature of hot blast and coke saved based on cold-blast requirements, the data for the points from which this curve is plotted being taken from Sir Lowthian Bell's book on "The Principles of the Manufacture of Iron and Steel."

A curve which represents the variations of coke consumption with heat added to the blast, also represents the combined effect of all physical and chemical changes taking place in the blast-furnace, whether the heat changes have to do with carbon monoxide reduction, the carbon reduction, or the heat absorbed by the iron, the slag, or by heating stock. It is therefore a curve of practice rather than of theory, in so far as it is accurately plotted.

It is evident from the slope of the initial portion of the curve, that a saving of 1 cwt. of coke is obtained for approximately each 100 degrees F. increase of blast temperature. The heat added in the blast per 100 degrees per ton of iron is 276,000 British thermal units. There are required 154,000 British thermal units per ton of iron to disintegrate 1 grain of moisture per cubic foot in the blast. This heat is therefore equivalent to $154,000 \div 276,000 = 0.56$ cwt. on the initial portion of the curve.

Thus the saving in the upper portion of the curve is less than $\frac{1}{2}$ cwt. per 100 degrees F., and the question now arises, what portion of the curve applies to the heat necessary to disintegrate moisture? It is a well-known fact that for the economical reduction of iron oxide in the blast furnace, as large a proportion as possible must be reduced by carbon monoxide.

Now, as this reduction occurs most readily at about 1100 degrees and decreases rapidly at higher temperatures, and as the temperature of the stock entering the furnace soon approaches this point, it follows that a limit to the amount of heat which should escape in the gases rising from the bosh is soon reached. It was pointed out by Sir Lowthian Bell years ago, that the economy of the Neilson hot blast was due to the fact that adding heat to the blast enabled it to supply much of the heat necessary in the bosh to melt the iron and slag. The heat which was thus absorbed did not have to pass through the upper carbon monoxide reducing zone, thereby heating it and retarding the reduction.

Now, the heat which the iron and slag require is only about 18 per cent. of the total. It appears self-evident, therefore, that the fewer heat units added to the blast, the easier it is for the iron and slag to absorb them before they pass out of the bosh; but as the 18 per cent. is approached, more and more escape to the reduction zone. Therefore, removing the moisture before it enters the furnace is equivalent to utilizing all the heat necessary to disintegrate it in melting the iron and fusing the slag. The economy to be expected from low moisture alone is therefore that represented by the initial portions of the curve, or 1 cwt. of coke for 100 degrees F. temperature of blast, or, as pointed out before, 0.56 cwt. per grain of moisture per cubic foot.

If five grains be taken as the average amount of moisture which can be eliminated, this would be equivalent to $5 \times 0.56 = 2.8$ cwt.; $2.8 \div 20 = 14$ per cent. of 20 cwt. per ton of iron. About two grains of moisture were added to secure uniformity, and no gain or loss was found except a very slight lowering of the silica, indicating that the harmful effect of the two grains added was almost neutralized.

If it be assumed that the heat gain due to uniformity is equivalent to one-half of this, or to the effect of one grain, the foregoing considerations would account for a saving of about 17 per cent. of fuel for dry blast. It may be said that a saving of 2.8 cwt. on 28 cwt. coke consumption on cold blast is not necessarily equivalent to a saving of 2.8 cwt. on 20 cwt. hot blast consumption.

There must, of course, be some difference, but it is probably very slight, because, while under cold blast consumption 40 per cent. more coke is burned than under hot blast 50 per cent. more ore is contained in the furnace under hot blast conditions. Therefore, while there is less carbon monoxide generated, it acts on 50 per cent. more ore, and under better conditions of efficiency—namely, lower temperature. The rate of increase of ore volume to coke volume is also approximately twice as great per hundredweight of coke decrease at 20 cwt. hot blast consumption as at 28 cwt. cold blast consumption. The coke saving in the two cases should therefore be very closely similar.

The author regrets that, in the limited time at his disposal, he has been unable to get reliable and full data for more points for the curve. The data are difficult to find, because all the figures for the curve must be for one furnace, operating in each case under the same conditions of ore, fuel and fluxes. As it is, he trusts there is sufficient to allow of the present contribution finding acceptance as another interesting chapter of the story of the development of the Gayley dry air blast.

Carpenter Machine Screw Taps and Dies.—The J. M. Carpenter Tap & Die Company, Pawtucket, R. I., announces that for the past two years it has been furnishing taps and dies to the A. S. M. E. standard as recommended by the American Society of Mechanical Engineers at its meeting in Indianapolis, May, 1907. It has a complete stock of the taps and dies made to the United States standard of other than regular pitches furnished at regular prices as per new lists, which lists, also lists of the A. S. M. E. standard, will be furnished to all who may request. The company also announces that as there has been no uniform standard of V-thread taps and dies that is interchangeable with different makes of taps and dies, it is putting out lists of the threads furnished other than regular United States standard at the regular price on hand taps, nut taps and taper taps, and as the V form of thread in the near future is intended to be made only to order, and will thus soon become obsolete, it may be of interest to users of taps and dies to receive a copy of these lists, which will be freely furnished on request.

Advance in Eastern Blast Furnace Wages.—At a number of Eastern blast furnaces and iron mines wages are being restored to the basis prevailing before the reduction of 10 per cent., which went into effect March 15 of this year. On October 1 such restorations were made by the Thomas Iron Company, applying to labor at its blast furnaces at Hokendauqua, Island Park, Alburtils,

and Hellertown, Pa., as well as at the iron mines operated by the company. Announcement was made by the Empire Steel & Iron Company of a similar advance at its Pennsylvania and New Jersey blast furnaces and iron mines.

The Bethlehem Steel Company Acquires the Cheever Iron Mine.

The Bethlehem Iron Mines Company, a subsidiary of the Bethlehem Steel Corporation, has purchased a controlling interest in the Cheever Iron Ore Company, Port Henry, N. Y., from the Presbrey interests, owning 51 per cent. of the stock of the company. The officers and directors of the Bethlehem Iron Mines Company are the following: H. S. Snyder, president; F. S. Witherbee, vice-president; B. H. Jones, secretary and treasurer; F. A. Schick, auditor; C. M. Schwab, W. F. Foote, L. W. Francis, A. E. Hodgkins, formerly connected with Witherbee, Sherman & Co., has been appointed general manager of the property. Extensive improvements are contemplated, looking to a material increase in the output. The new equipment will include compressors and hoisting machinery, all to be electrically driven. Current will be supplied from Witherbee, Sherman & Co.'s central power station at Port Henry. The latter firm retains its interest of 49 per cent. in the company, and is to manage the mining operations. The Bethlehem Steel Company will take the entire output.

The Cheever mine is probably the oldest in northern New York, there being historical references to the mining of ore there in the time of the Revolutionary War. The Cheever Iron Company, the organization which preceded the Cheever Iron Ore Company, dates back to 1820. The mine was operated at intervals up to 20 years ago, and it is estimated that about 3,000,000 tons of ore was taken out. About 1890 Oliver S. Presbrey, then superintendent, acquired control of the property, and two years ago he sold a 49 per cent. interest to Witherbee, Sherman & Co. At that time the Cheever Iron Ore Company was formed, with a capital of \$250,000. A magnetic separating plant was installed with a capacity of 500 tons a day. In the past year development work has been in progress and shipments have been made to New Jersey and eastern Pennsylvania furnaces.

In the concentrating operations at the Cheever mine the ore is cobbled, about 20 per cent. of the shipping ore being broken to 1-in. size, while most of the remainder is of 4-mesh fineness. It runs 62 to 63 per cent. in metallic iron, about 0.1 per cent. in phosphorus, 7 per cent. in silica and 2 per cent. in lime, being nearly self-fluxing. At present about 350 tons a day of shipping ore can be produced, and this will be increased when the improvements are completed to 500 tons a day.

Cuban Iron Ore Shipments.

The following table, taken from a report by E. C. Harder, of the United States Geological Survey, issued as an advance chapter from "Mineral Resources of the United States, Calendar Year 1908," shows the shipments of iron ore from Cuba since the opening of the mines in 1884:

	Gross tons.		Gross tons.
1884.....	25,295	1897.....	454,285
1885.....	80,716	1898.....	168,339
1886.....	112,074	1899.....	377,189
1887.....	94,240	1900.....	446,872
1888.....	206,061	1901.....	552,248
1889.....	260,291	1902.....	699,734
1890.....	363,842	1903.....	623,621
1891.....	264,262	1904.....	387,273
1892.....	341,654	1905.....	561,159
1893.....	351,175	1906.....	640,574
1894.....	156,826	1907.....	681,393
1895.....	382,494	1908.....	819,434
1896.....	412,995		

By far the larger proportion of this ore came to the United States, the imports from Cuba in 1908 being 579,668 tons. This was about three-fourths of the total imports of iron ore; in 1907 Cuba supplied a little more than half the ore imported.

PERSONAL.

Harry E. Sheldon, president of the Allegheny Steel Company, Pittsburgh, has returned from an extended European trip.

W. E. Tenney, formerly of the Standard Meter Company, New York, has taken charge of the New York office of the Variable Speed Clutch Company, Milwaukee, Wis. This branch office, which has just been opened, is in the Hudson Terminal Building, 50 Church street.

Frank C. Neale, president of the Kittanning Iron & Steel Mfg. Company, Pittsburgh, has returned from a four weeks' trip through England, Wales and France.

George E. Lees, formerly chief of the order department of the Shelby Steel Tube Company, and later a member of the Lees-Williams Company, Pittsburgh, is now employed as advertising manager of the American Vanadium Company, Frick Building, Pittsburgh, his work involving the preparation of booklets, advertising, &c., in which line he has had much experience.

Arthur S. Blanchard, formerly with the Atha Steel Casting Company and the Wellman-Seaver-Morgan Company, is now associated with the Birdsboro Steel Foundry & Machine Company, Birdsboro, Pa., in the capacity of assistant general manager.

Charles W. Rowlands, who has been assistant secretary of the Crucible Steel Company of America, Pittsburgh, for three years, has been elected secretary, to fill the vacancy caused by the death of Alexander Thomas, who died in Germany nearly a year ago.

Joseph Wood, first vice-president of the Pennsylvania Company, has been elected a director of the Standard Underground Cable Company, succeeding Robert Pitcairn, deceased.

A. J. Gates, superintendent of the Gates Works, Chicago, which is now a branch of the Allis-Chalmers Company, has resigned to engage in business for himself.

W. A. Hengstenberg, until recently connected with the Newhall Forge & Iron Company, New York, goes to the Seneca Chain Company, Kent, Ohio, as secretary and general manager.

Clay Sprecher has been appointed assistant manager of the Allis-Chalmers Company at the Pittsburgh sales office.

R. L. Young of the engineering apprenticeship course of the Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa., has accepted a position with the *Electrochemical and Metallurgical Industry* of New York, in charge of its Pittsburgh office.

J. C. Maben, president of the Sloss-Sheffield Steel & Iron Company, has returned from a two months' absence in Europe.

F. H. Rose of the Upson Nut Company, Cleveland, will sail from New York October 16 for a four months' trip around the world.

Among the arrivals from abroad is Millard Hunsicker, who for many years was the foreign representative of the Carnegie Steel Company, with headquarters in London.

G. G. McMurtry, of the United States Steel Corporation, has returned from Europe.

W. E. Watson, formerly with the National Tube Company, Pittsburgh, has succeeded J. H. P. Wharton as assistant manager of sales of the La Belle Iron Works, Steubenville, Ohio.

Benjamin Guggenheim, president of the International Steam Pump Company, arrived in New York from Europe October 5.

The Upson Nut Company Orders Its Steel Mill Equipment.—The Upson Nut Company, Cleveland, Ohio, has contracted for the complete mill equipment of its new steel plant with the Mesta Machine Company, Pittsburgh. The order includes 46 x 60 in. reversing engines and a complete 24-in. blooming mill, including shears, tables, &c. The auxiliary machinery will be electrically

driven, as will also be the screw-down on the blooming mill. Deliveries will be made early next spring.

The Crucible Steel Company of America.

The annual report of the Crucible Steel Company of America for the fiscal year ended August 31, 1909, shows gross earnings of \$12,121,651, an increase of \$3,193,621, and total net income of \$2,024,926, an increase of \$2,534,951. The company paid out \$549,821 in dividends, an increase of \$305,456, leaving a surplus of \$1,465,105. In the preceding 12 months the company reported a deficit of \$520,024. The report says: "The present surplus is the largest in the company's history. It is represented by quick assets built up solely out of operating profits. It is hoped that the regular payment of 1½ per cent. will be distributed on the preferred stock in December, by which time it is expected that the entire outstanding indebtedness will have been liquidated."

The detailed income account for year ended August 31 shows the following comparisons with the previous year:

	1909.	Increase.
Gross earnings.....	\$12,121,651	\$3,193,621
Operating expenses.....	9,917,908	1,110,625
Net earnings.....	\$2,204,743	\$2,083,996
Depreciation	208,335	*440,897
Balance net.....	\$1,995,408	\$2,523,893
Other income.....	29,518	11,058
Total net.....	\$2,024,926	\$2,534,951
Interest on mortgage.....	10,000	.....
Balance.....	\$2,014,926	\$2,534,951
Preferred dividends.....	549,821	305,456
Surplus.....	\$1,465,105	\$2,229,495
Previous surplus.....	1,692,894	*764,390
Total surplus.....	\$3,157,999	\$1,465,105

* Decrease.

According to the report the unfilled orders and contracts on hand on August 31 amounted to 91,498 tons, against 72,984 tons in the previous year. The condition of the company continues to improve. It has no bonded debt, either authorized or outstanding, and its properties are free and unencumbered except for "the two purchase money mortgages of \$100,000 each, one of which was, however, paid off during September, 1909."

The banking obligations and other bills payable at the commencement of the fiscal year amounted to \$1,481,419. The report, which is signed by Herbert Du Puy, chairman of the Executive Committee, and Frank B. Smith, president, adds:

"During the year, your management took the conservative view that before paying full dividends of 7 per cent. on the preferred stock of the company these debts should be liquidated. On August 31, 1909, they amounted to \$758,000, showing a reduction of \$723,419 during the year. Since August 31 they have been further reduced by \$258,000, leaving a present liability of \$500,000, which it is anticipated will be liquidated before December 31, 1909. The current assets on August 31, 1909, were valued at \$8,628,915, including \$644,308 in cash, whilst the current liabilities were reduced to \$1,642,829, showing an excess of current assets over current liabilities of \$6,986,086."

Touching the sale of the Howe-Brown property to the Pennsylvania Railroad the report says: "Your company still retains 25 per cent of the original holding, which, through the result of this transaction, must largely increase in value. The proceeds less the cost of additions and extensions to other properties of the company have been deducted from property account. The spring department, built just before the panic, and which had not been operated, was, under the new management, placed into active service as a producing property." It has already booked a very large tonnage of orders, the report states, and should prove a valuable addition to the company's assets.

Liberal expenditures, amounting to \$689,775, were made during the year for repairs and to maintain the efficiency of the various properties, every such expenditure being charged to operating expenses and absorbed into the cost of production.

A New Pig Iron Record.

September Output 2,385,206 Tons.

**Production Now at the Rate of About
29,750,000 Tons a Year.**

The pig iron statistics for September show a surprising increase over the August output, the production of coke and anthracite iron for the 30 days of last month having been 2,385,206 gross tons, against 2,248,930 tons in the 31 days of August. Thus the September record exceeds by nearly 50,000 tons that made in October, 1907. That this should have been done in less than two years after the panic is striking proof of the tremendous recuperative power of the country as exhibited in the present astonishing movement in the iron trade. The accompanying diagram shows how the spectacular increase in production has carried the curve well beyond the peak of October, 1907, and emphasizes the depth of the plunge made just following the panic.

The net gain in active furnaces in September was 18 and the weekly capacity of the 299 furnaces in operation October 1 was 564,885 tons, or at the rate of above 29,750,000 tons a year, counting charcoal iron at about 1000 tons a day. One new furnace was blown in in September—the second stack of the Cleveland Furnace Company, Cleveland, Ohio.

The furnaces of the United States Steel Corporation made a new record output in September at 1,184,370 tons, as against 1,102,288 tons in August, the previous high record.

Daily Rate of Production.

The daily rate of production of coke and anthracite pig iron by months, beginning with September, 1908, is as follows:

Daily Rate of Pig Iron Production by Months.—Gross Tons.

	Steel works.	Merchant.	Total.
September, 1908.....	31,117	16,183	47,300
October	32,217	18,337	50,554
November	32,705	19,890	52,595
December	35,172	20,986	56,158
January, 1909.....	35,983	21,992	57,975
February	38,367	22,609	60,976
March	36,811	22,421	59,232
April	36,436	21,526	57,962
May	40,531	20,222	60,753
June	45,507	19,149	64,656
July	48,670	19,123	67,793
August	51,354	21,192	72,546
September	55,381	24,146	79,527

Production of Steel Companies.

Returns from all plants of the United States Steel Corporation and the various independent steel companies show the following totals of product month by month. Only steel making iron is included in these figures, together with ferromanganese, spiegeleisen and ferrosilicon. These last are stated separately but are included in the first three columns of "total production."

Production of Steel Companies.—Gross Tons.

	Pig.—Total production.			Spiegeleisen and ferromanganese.	
	1907.	1908.	1909.	1908.	1909.
January	1,406,397	664,415	1,117,823	20,254	12,325
February	1,317,923	745,802	1,073,363	9,402	10,046
March	1,424,827	841,502	1,140,553	13,750	23,743
April	1,446,788	725,548	1,093,092	12,363	22,478
May	1,470,080	759,674	1,256,448	17,823	20,834
June	1,457,230	717,689	1,365,527	15,958	16,516
July	1,452,557	798,639	1,508,762	10,250	17,613
August	1,445,685	897,052	1,591,991	14,932	22,313
September	1,417,153	933,514	1,660,839	8,938	28,148
October	1,514,521	996,481	.....	12,174	.....
November	1,084,114	981,167	.....	15,882	.....
December	659,459	1,090,339	.....	6,510	.....

The number of active furnaces of the United States Steel Corporation and of the independent companies engaged in the production of steel-making pig iron at the beginning of each month since January appears below:

	Steel Corporation.	Independent steel companies.
Furnaces in blast February 1.....	62	49
Furnaces in blast March 1.....	65	45
Furnaces in blast April 1.....	66	39
Furnaces in blast May 1.....	68	42
Furnaces in blast June 1.....	77	48
Furnaces in blast July 1.....	82	50
Furnaces in blast August 1.....	93	52
Furnaces in blast September 1.....	97	57
Furnaces in blast October 1.....	100	57

As only steel making iron is reckoned in the above, the Steel Corporation's merchant iron furnaces in Alabama and its one Bay View stack which is making foundry

iron, are not included; nor are the two Lebanon Valley furnaces of the Lackawanna Steel Company and the Alabama furnaces of the Republic Iron & Steel Company, all of which make foundry iron.

September Product by Districts.

The table below gives the production of all coke and anthracite furnaces in September and the four months preceding:

Monthly Pig Iron Production.—Gross Tons.

	May. (31 days)	June. (30 days)	July. (31 days)	August. (31 days)	Sept. (30 days)
New York.....	112,669	123,792	152,249	173,317	176,777
New Jersey....	19,836	18,590	19,002	22,765	29,703
Lehigh Valley..	58,176	52,464	55,646	58,607	62,332
Schuylkill Val..	52,755	46,004	47,323	48,105	52,234
Lower Susquehanna and Lebanon Val.	52,687	52,361	50,738	54,713	69,252
Pittsburgh Dis..	446,656	479,362	524,102	538,294	548,968
Shenango Val..	103,783	110,004	128,251	143,722	154,614
West. Penn....	128,413	112,975	118,904	118,174	125,712
Md., Va. and Kentucky...	60,143	54,448	52,551	67,752	64,652
Wheeling Dis..	63,980	94,664	111,620	125,281	126,077
Mahoning Val..	171,811	175,949	196,593	207,887	211,979
Central and North. Ohio.	125,554	135,319	148,969	153,797	187,366
Hocking Valley, Hanging Rock and S.W. Ohio.	38,995	32,908	26,872	26,804	30,628
Mich., Minn., Mo., Wis., Colo....	58,045	59,187	57,008	61,980	62,601
Chicago Dis....	250,363	263,126	287,106	282,668	300,261
Alabama	119,823	101,280	106,482	139,131	154,353
Tennessee, Georgia and Texas	19,641	18,433	20,015	23,483	27,697

Totals ..1,883,330 1,930,866 2,103,431 2,248,930 2,385,206

Capacity in Blast October 1 and September 1.

The following table shows the weekly capacity of furnaces in blast October 1 and September 1, the furnaces blown in in September being rated on the records of previous performance:

Coke and Anthracite Furnaces in Blast.

Location of furnaces.	Total		October 1.		September 1.	
	number of stacks.	Capacity in blast.	Number in blast.	Capacity per week.	Number in blast.	Capacity per week.
New York:						
Buffalo	16	16	37,461	16	37,380	
Other New York.	7	3	3,642	3	3,702	
New Jersey.....	8	5	7,234	4	5,138	
Spiegel	2	0	0	0	0	
Pennsylvania:						
Lehigh Valley...	25	16	14,840	15	13,706	
Spiegel	3	2	721	2	574	
Schuylkill Valley.	15	9	12,387	8	10,864	
Low. Susquehanna	7	6	8,958	6	8,320	
Spiegel	1	1	576	1	575	
Lebanon Valley..	10	7	6,853	6	5,590	
Pittsburgh Dist..	47	46	125,580	45	121,110	
Spiegel	3	3	2,955	2	2,480	
Shenango Valley.	20	18	36,078	17	31,850	
W. Pennsylvania.	27	17	28,833	18	28,826	
Maryland	4	4	8,042	3	5,750	
Wheeling District..	14	12	29,414	12	28,966	
Ohio:						
Mahoning Valley.	20	20	51,631	17	46,942	
Central and North and Michigan.	23	20	47,207	18	40,455	
Hocking Valley, Hang. Rock and S. W. Ohio....	15	9	7,096	8	6,052	
Illinois and Indiana	29	24	67,431	25	66,996	
Spiegel	2	3	2,313	1	1,242	
Minnesota and Wis.	7	6	7,381	4	4,622	
Colorado & Missouri	7	4	6,829	4	7,247	
The South:						
Virginia	23	9	6,438	11	8,455	
Kentucky	5	1	714	1	705	
Alabama	46	27	38,226	23	31,850	
Tennessee	18	10	6,341	9	5,640	
Georgia	3	1	425	0	0	
Totals.....	407	299	564,885	279	525,037	

Among furnaces blown in in September were one Wharton in New Jersey, one Warwick in the Schuylkill Valley, one Crane in the Lehigh Valley, Edith and Clinton in the Pittsburgh District, Fannie in the Shenango Valley, one Steelton in the Lower Susquehanna Valley, one Lebanon in the Lebanon Valley, one Maryland at Sparrow's Point, one Columbus, one Cleveland and one Toledo in Ohio, Hamilton in the Hanging Rock District, one Joliet and one Iroquois in the Chicago District, one Maryville and Thomas in Wisconsin, McKeefrey, Mary and Niles in the Mahoning Valley, one Pioneer, one Sloss, one Bessemer and one Ensley in Alabama, Standard in Tennessee and Rome in Georgia.

Very few furnaces were blown out in the month. The list includes Detroit, on Zug Island, Mich.; one Cambria in western Pennsylvania, one Low Moor and Radford Crane in Virginia, and one South Chicago of the Illinois Steel Company.

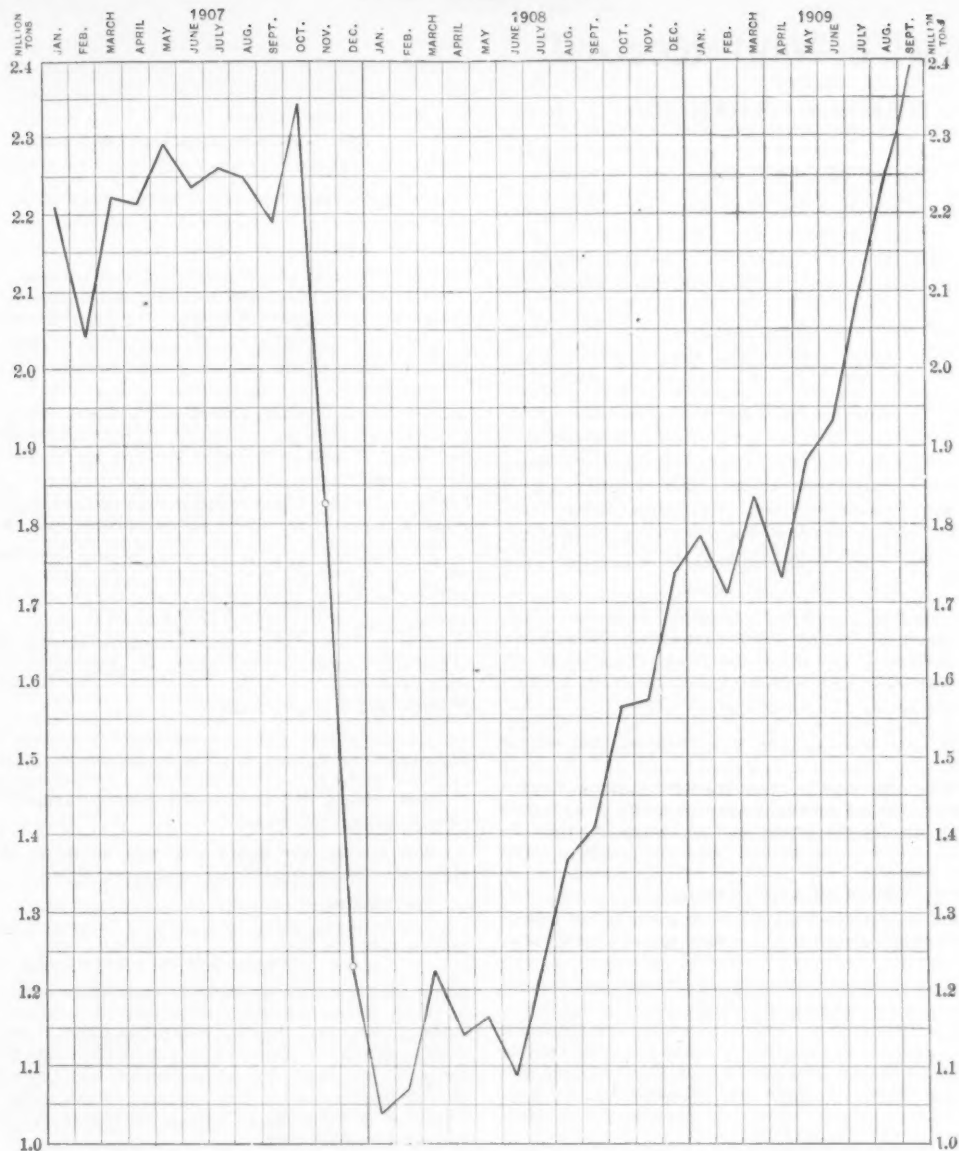


Diagram of Coke and Anthracite Pig Iron Production in the United States in 1907, 1908 and 1909.

A Record of Active Capacity.

The active weekly capacity in coke and anthracite iron has shown the following fluctuations since January 1, 1907, the figures representing gross tons:

	Capacity per week.		Capacity per week.
October 1, 1909.....	564,885	May 1.....	268,674
September 1.....	525,037	April 1.....	264,890
August 1.....	488,742	March 1.....	267,437
July 1.....	463,029	February 1.....	241,925
June 1.....	446,096	January 1, 1908.....	235,152
May 1.....	412,010	December 1, 1907.....	347,372
April 1.....	409,217	November 1.....	491,436
March 1.....	420,807	October 1.....	511,397
February 1.....	414,497	September 1.....	507,768
January 1, 1909.....	401,994	August 1.....	513,471
December 1, 1908.....	381,102	July 1.....	528,170
November 1.....	362,685	June 1.....	523,220
October 1.....	337,925	May 1.....	524,538
September 1.....	313,112	April 1.....	496,456
August 1.....	284,590	March 1.....	511,035
July 1.....	264,452	February 1.....	492,359
June 1.....	259,284	January 1, 1907.....	507,397

The Curve of Pig Iron Production.

The spectacular performance of the blast furnaces in September gives especial significance to the curve of pig iron production shown in the accompanying chart. The line has now gone to the highest point reached in the history of the iron trade. The figures plotted in the chart, giving production of coke and anthracite pig iron by months are as follows:

	1907.	1908.	1909.
January	2,205,607	1,045,250	1,797,560
February	2,045,068	1,077,740	1,707,340
March	2,226,457	1,228,204	1,832,194
April	2,216,558	1,149,602	1,738,877
May	2,295,505	1,165,688	1,833,330
June	2,234,575	1,092,131	1,929,884
July	2,255,660	1,218,129	2,103,431
August	2,250,410	1,359,831	2,246,480
September	2,183,487	1,418,998	2,385,206
October	2,536,972	1,567,198	
November	1,828,125	1,577,854	
December	1,234,279	1,740,912	

Customs Decisions.

Steel Scrapers for Wood Working.

Failure on the part of Alfred Andresen & Co., to mention in their protest two paragraphs of the tariff has resulted in the Board of United States General Appraisers rejecting the protest on the ground that it was defective. The merchandise under consideration consisted of steel plates or sheets, intended to be used as wood scrapers by carpenters and finishers of hardwood. The customs authorities decided that the plates were dutiable at 45 per cent. as articles of metal for which no provision exists in the law. Andresen & Co. set up the contention in their protest filed with the board that the articles are dutiable at 35 per cent. under paragraph 135 as "steel plates."

General Appraiser Fischer, however, in his decision for the Board says that the claim in the protest that the articles are dutiable only at the rate provided in paragraph 135 is defective as the plates have been polished and tempered. The decision holds that the importers should have incorporated in their protest paragraph 141, as well as paragraph 135. Mr. Fischer points out that the plates are properly dutiable at 1 cent per pound under paragraph 141, in addition to the primary rate claimed under paragraph 135. As the claim for the additional duty accruing under paragraph 141 is not made, the board overrules the protest, although the collector's classification at 45 per cent. is obviously incorrect.

The Jones & Laughlin Steel Company, Pittsburgh, is asking bids on 12 electric cranes to be installed in its new plant at Aliquippa, Pa.

NEWS OF THE WORKS.

Iron and Steel.

The manufacture of steel by an electrical process is the object of the Mexico Steel & Chemical Company, Mexico City, Mexico, which has been organized with a capital stock of \$1,000,000. F. S. Pierson of the Mexico Light & Power Company is identified with the undertaking, as is also R. C. Brown, who will be charged with the management of the business.

The Flimken-Detroit Axle Company, Detroit, Mich., has purchased additional land adjoining its plant on Clark avenue and will build a large extension.

The Sligo Iron & Steel Company, Connellsville, Pa., manufacturer of bar iron, which is completing work on two new furnaces and overhauling its 14-in. bar mill, expects to resume operations this month. During the summer two 200-hp. water tube boilers were installed, which, with the improvements made before, place its plant in excellent condition for a steady run.

The Canton, Ohio, mill of the American Sheet & Tin Plate Company is soon to begin operations under the direction of Charles Rice, assistant superintendent of the Canal Dover, Ohio, mill, who is transferred. The Dresden, Ohio, plant of the company is in operation after a shutdown of several years, with A. A. Garver as superintendent.

The nail and wire department of the Youngstown Sheet & Tube Company, Struthers, Ohio, is working to capacity. Large shipments recently made included one to Panama for Government work on the Canal, the Pacific Coast and Cuba. The domestic demand for nails and wire is unusually heavy at this time. The additions to the equipment of the wire and nail mills have been completed and the new buildings recently finished are now in use. The rod mill, which was double-stranded last spring, has been running continuously, and with business in sight, in addition to providing for the wire mill, the capacity is taken until well along toward the end of the year. Still further additions to the equipment and buildings for this department are in prospect, the next construction to be a large storehouse 85 x 485 ft.

The Allegheny Steel Company, Pittsburgh, contemplates making some additions to its boiler tube department at Brackenridge, Pa., recently acquired. Contract for the equipment will shortly be placed, which will, when in operation, produce about 1500 tons of steel and charcoal boiler tubes per month.

The old plant of the Waynesburg Forge, Sheet & Tin Mills, Waynesburg, Pa., which was recently purchased at receiver's sale by local capitalists, is expected to be in shape for operation shortly. The company is capitalized at \$120,000, and the following are the officers: I. N. Kuhn, president; R. L. Hoskinson, vice-president; Ellis B. Bailey, secretary, and R. R. Hardesty, treasurer.

The Tennessee Coal, Iron & Railroad Company now has in blast four furnaces at Bessemer, five furnaces at Ensley, and one at Birmingham, Ala. All stacks at Bessemer and that at Birmingham are making foundry iron, while the Ensley group are on basic iron.

The Sloss-Sheffield Steel & Iron Company has two furnaces active at North Birmingham, two at Birmingham and two at Sheffield, Ala.

The Republic Iron & Steel Company now has in blast three furnaces at its Thomas, Ala., plant.

The Alabama Consolidated Coal & Iron Company has in operation one furnace at Gadsden and one at Ironton, Ala.

The furnace of the Detroit Iron & Steel Company, Zug Island, Mich., was blown out September 24.

In the Pittsburgh District every blast furnace was in operation October 1, with the exception of one Carrie, which was being repaired. Edith and Clinton furnaces were both blown in September 1.

The furnace of the Nittany Iron Company, Bellefonte, Pa., which has been out for repairs for some time, is expected to blow in about October 15.

Both Lebanon, Pa., furnaces of the Pennsylvania Steel Company are now in operation, the second having been blown in September 5.

The furnace of the Pulaski Iron Company, Pulaski, Va., which blew out October 4 for repairs, will probably be inactive for 60 days.

McKeefrey Furnace of the Salem Iron Company, Leetonia, Ohio, which has been out for several months, was blown in September 27.

The Irondale Furnace Company, Irondale, Wash., whose blast furnace was expected to go in in September, has postponed starting it up until early in January.

D. Lamond & Son, Pittsburgh, engineers, contractors and builders of blast furnaces and hot blast stoves, have the contract for a 20 x 85 ft. hot blast stove for the Ironton Iron Company, Ironton, Ohio. In the construction of this stove the builders will use the new style of checkerwork, recently patented by D. Lamond, in which the checkers are locked and bonded, although free to expand and contract independently of the encircling walls.

General Machinery.

Plant improvements being made by the Dempster Mfg. Company, Beatrice, Neb., include the extension of its foundry by the erection of an addition, 80 x 100 ft., also the erection of a three-story and basement implement factory 60 x 160 ft. Provision for additional power required to supply the works has been made by the purchase of a 150-hp. Murray Corliss engine and Allis-Chalmers electric generators and motors. The total cost of these improvements, including the power plant, will aggregate \$40,000.

The Wilkinson Machine Company, Savannah, Ga., engineer and machinist, has succeeded to the business of the Georgia Machine Works and, in addition to general machine, blacksmith and boiler work, will carry on a general cast iron and foundry business.

The National Automatic Tool Company, Richmond, Ind., has let the contract to the L. Eid Construction Company of Cincinnati and Bendfeldt & Sons, Richmond, for its buildings, the main one of which will be 60 x 200 ft., two stories.

The Hirsch-Wesson Mfg. Company, recently organized, which expects to erect its own plant at Flint, Mich., will require power machinery and some light tools for the manufacture of fixtures.

The Chicago & Northwestern Railroad has completed plans for what is said to be the largest roundhouse ever erected. It will be built at Clinton, Iowa, and is to include tools for emergency repair equipment, wrecking cranes, &c.

The Indiana Auto Parts Company, Marion, Ind., recently organized to manufacture motor car specialties, will be in the market shortly for tools. A plant is to be built or leased. Electric drive is contemplated.

The Lake Shore Electric Railroad, Cleveland, Ohio, is placing equipment in its new shops at Sandusky. The requirements of these works will be partially met by removing tools from the Fremont shops, but considerable new apparatus is to be purchased during the winter.

Bids for an air compressor will be taken shortly by the Muskogee City Water Works, Muskogee, Okla.

The Tips Foundry & Machine Company, Austin, Texas, is to rebuild its plant which was recently destroyed by fire, the intention being to erect a fireproof machine shop, about 50 x 200 ft. It has not yet been decided whether steel, brick or reinforced concrete will be used in the construction. A temporary structure is now being erected on the site where the old plant stood so that work can be resumed as quickly as possible. The engines which the company has recently constructed and were ready for shipment will be overhauled and repaired and placed on the market within the next few weeks. The foundry will be placed in operation as soon as an engine can be installed to operate the machinery.

The Portland Cement Company, Salt Lake City, Utah, is preparing to install a breaker plant, crushing rolls, tube and ball mills, rotary kilns, boiler, engine and electrical machinery, comprising a complete manufacturing unit.

The Knapp Water Tube Boiler Mfg. Company, Minneapolis, Minn., has started work on a new plant, which will be equipped with modern machinery.

Dodge Brothers, Detroit, Mich., manufacturers of special machinery, gears, automobile parts, &c., have purchased a 24-acre tract of land near the plant of the Russell Wheel & Foundry Company on Joseph Campau avenue. The purchasers are not yet ready to announce their plans for utilizing the new tract.

The Ft. Wayne Mfg. Company has been incorporated at Ft. Wayne, Ind., with \$10,000 capital stock, to manufacture all kinds of electrical machinery. The incorporators are Wm. M. Fry, St. Louis; Perry Crawford, Rogers, Ohio, and Frank R. Dulin, Ft. Wayne.

The Eureka Machine Company, Lansing, Mich., is receiving bids for factory building 50 x 115 ft., which it will build at Casey and Handy streets.

The Hart-Parr Company, builder of gasoline engines, at Aberdeen, S. D., will erect an addition to its works 50 x 90 ft.

A new plant, with power equipment, compressor, pneumatic tools, saws, holsts, &c., will be erected this fall by the Menominee (Mich.) Granite & Marble Works.

The De Shaum-Hornell Motor Company, Hornell, N. Y., has let contract for the construction of its new factory, two stories, 60 x 200 ft., of brick and steel construction. Considerable equipment of lathes, drills and other machinery will be required.

The Interstate Automobile Company, Muncie, Ind., is increasing its equipment of motor driven tools.

The Rogers Automobile Company, which was recently organized with a capital stock of \$250,000, will erect a plant at Ralston, Neb., near Omaha. The machinery requirements will be large.

The Pittsburg-Buffalo Coal Company is building a machine shop at Marianna, Pa., of brick, concrete and structural steel, 79 x 182 ft., one story.

Foundries.

The Indiana Foundry Company, Ltd., Indiana, Pa., has been obliged to increase its foundry capacity as a result of the success it is meeting with in the sale of sand drying stoves. The United States Government is now using these stoves in its navy yards and in canal work on the Isthmus of Panama. Many of the leading railroads and trolley lines have also adopted the stove.

The foundry of the Criterion Brass & Motor Company, Des Moines, has been acquired by Geo. E. Messenger and will be operated in his interest.

A foundry for the North American Boiler Company is to be erected at Muskegon, Mich., and a full line of equipment purchased. The building contract has already been let.

The H. E. Mills Mfg. Company is preparing plans for a plant to be built at Solvay, N. Y., for the manufacture of foundry supplies.

William Shimer, Son & Co., Freemansburg, Pa., are making a number of improvements to their plant. An addition 40 x 75 ft. has been made to the machine shop, to be used as a suction gas power plant and to house the new exhaust tumbling barrel plant. This building is of stone construction. A frame building 40 x 100 ft. is being erected for finishing and storage, and an addition 75 x 100 ft. is being built to the foundry, which will make the foundry 75 x 200 ft. This building will be of stone and will practically double the foundry capacity. The company is replacing its steam power plant with a suction gas plant furnished by the Backus Water Motor Company, Newark, N. J. The machinery requirements have been covered.

The Duquesne Steel Foundry Company, Pittsburgh, with plant at Coraopolis, Pa., on the Pittsburgh & Lake Erie Railroad, is installing a 10-ton open hearth furnace. The company already has two other 25-ton furnaces and two 2-ton Tropenas converters, its product being steel castings, in which line it is doing an increased business.

The Michigan Crucible Steel Casting Company, Detroit, Mich., will build a brick and steel addition to its foundry, 248 x 250 ft.

The Central Machine & Foundry Company has been incorporated at Marion, Ind., with \$25,000 capital stock, to do a machinery and foundry business. The directors are Charles C. Chamberlain, Henry L. Erlewine, A. E. Loucks.

Bridges and Buildings.

The Dubuque Packing Company, Dubuque, Iowa, will build a \$50,000 addition to its plant early next spring.

Udolpho Sned, Louisville, Ky., has had plans completed for a new factory building to cost about \$200,000. An eight-story building, about 90 x 185 ft., is to be erected for manufacturing purposes, the tenants to be supplied with light, heat and power. Plans were prepared by D. X. Murphy & Brothers.

Power Plant Equipment.

The installation of an electric power plant at an estimated cost of \$50,000 has been begun by the Sunnyslope Land Company, of which George H. Ennis of Los Angeles, Cal., is president.

The Pawling (N. Y.) Electric Light & Power Company will be in the market before long for an engine or turbine and an electric generator, exciter, &c. A new power plant is to be erected.

The authorities at Arlington, S. D., have under consideration the building of a municipal power and lighting plant. A producer-engine electric unit is favored.

The Liberty Light & Power Company has been organized at Richmond, Ind., with \$25,000 capital stock, to supply electric light and power. The incorporators are R. S. Ashe, G. E. Varney and I. A. Perkins.

The trustees of the Indiana State School for the Deaf will receive sealed proposals until October 15 for boilers, stokers, heaters, pumps, generators, switchboard, refrigerating and other equipment for the institution. James Bingham, 54 State House, Indianapolis, Ind., is secretary of the commission.

Altus, Okla., will enlarge the municipal electric plant and install pumping machinery for an extensive water distribution system.

A hydraulic turbine for low head will be purchased by the New England Company, Rockville, Conn., to drive a generator for furnishing electric power to operate the mills.

New ore crushing equipment will be installed this fall by the Homestake Mining Company, Lead, S. D. Plans for the large hydro-electric power plant are being rapidly matured.

The Hamlin Light & Power Company, Hamlin, Texas, has been incorporated with a capital stock of \$15,000, by C. Thompson, G. E. Spurlin and Walter L. Morris.

The American Car & Foundry Company is remodeling and extending its electrical equipment at Berwick, Pa. Some additional motors will be installed.

A new engine and generator will probably be purchased by Allain & Crow, Carlisle, Ark., for the electric power and lighting plant which recently passed under their control.

Detroit, Minn., has rejected all tenders of power and pump-

ing machinery with which to equip the proposed addition to the municipal plant, and will ask for new bids.

The Power Construction Company, Galena, Ill., and not the Interstate Construction Company, is building a new power plant for the Interstate Light & Power Company. This plant, which will shortly be completed, will furnish light and power to Galena, Ill., and Flatteville, Cuba City, Benton and Hazel Green, Wis., also power to a large number of well developed zinc mines in the vicinity. The enterprise involves the building of about 26 miles of high tension line at 33,000 volts and about 30 miles of low tension line at 4000 volts. The plant is being erected under the supervision of H. M. Byllesby & Co., Chicago, consulting engineers, and will be up to date in every particular.

The Rapid Motor Vehicle Company, Pontiac, Mich., will install electric generating units with Corliss engine drive, aggregating 1500 hp., with subsidiary apparatus for complete power service.

The Tandem Gas Engine Works, Houston, Texas, will be considerably enlarged.

The Martin Electric & Power Company, Martin, Texas, will build a modern generating station to replace one that was recently burned.

A hydro-electric plant will be constructed by the Arizona & Eastern Consolidated Mining Company, Globe, Ariz., to furnish power for operating its properties.

Recent orders of the Crocker-Wheeler Company, Ampere, N. J., include Southern Iron & Steel Company at Roger, Ga., two 250-kw. engine type direct current generators and 275 hp. of indirect current motors; Republic Iron & Steel Company, Youngstown, Ohio, 600-kw. engine type direct current generator to be added to a plant consisting of two 300-kw. Crocker-Wheeler generators; Nonquit Spinning Company, New Bedford, Mass., 375-kw. of direct current generators; Southwark Mills Company, Philadelphia, Pa., 250-kw. engine type direct current generator and two 50-hp. motors; Goodman, Loeb & Co., Philadelphia, Pa., 275-kw. engine type direct current generator.

The Oliver Iron & Steel Company, Pittsburgh, has recently had installed in its power house a 150-hp. Terry turbine and a Worthington pump of 7,000,000 gal. capacity. A shipment of four 300-hp. Terry turbines, intended to drive De Laval pumps, is also being made to the Johnstown Water Company, Johnstown, Pa.

Fires.

The plant of the Kauder-Weldon Dyeing Machine Company, Amsterdam, N. Y., was burned September 22, the loss being about \$40,000.

Fire in the foundry of the Parkhurst Elevator Company at Peru, Ind., September 23, caused a loss of \$10,000. The company is controlled by the Otis Elevator Company. J. W. Parkhurst is manager.

Hardware.

The Kentucky Rim & Shaft Company, Louisville, Ky., of which H. F. Donigan, formerly of the Todd-Donigan Iron Company, is secretary, has purchased the woodworking plant of the Skinner-Russell Company situated on Central avenue, near First street, and will take over the Louisville Woodstock Company and the Louisville Spoke & Bending Company. The new company will manufacture a full line of wagon and carriage woodwork.

The American Carving Works, Jamestown, N. Y., will erect and equip a two-story factory, 32 x 64 ft.

The Safety Door Hanger Company, Ashland, Ohio, has completed plans for a two-story factory, 40 x 100 ft., brick, which it will erect at once.

The Dawson Hardware Company has been incorporated at Buffalo, N. Y., to manufacture hardware according to an invention of S. R. Dawson, employing a secret formula by which it is claimed copper can be hardened to a degree that will make it valuable for cutting tools. Among the directors are S. R. Dawson, Frank A. Abbott, L. T. Chase and Wm. M. Ramsdell. The present offices of the company are at 707 D. S. Morgan Building.

Miscellaneous.

The Buckman & Kean Japanning Company, Woburn, Mass., is to rebuild the part of its plant recently destroyed by fire, the new buildings to be of mill construction. The boilers and engine were only slightly damaged.

W. H. Ives, Oswego, N. Y., will build an automobile factory on East Main street, 40 x 190 ft., with wing 40 x 93 ft. Considerable machinery equipment will be installed.

Wheeler & Schebler, manufacturers of carbureters, Indianapolis, Ind., will begin the erection of a new factory building as soon as contracts can be let. The building will be a two-story fireproof structure 115 x 150 ft., of reinforced concrete, to cost approximately \$60,000.

The Indiana Electric Transmission Company, Lafayette, Ind., has given notice of its purpose to change location to Terre Haute, Ind. Thomas Duncan is president.

The Ontario Power Company, Niagara Falls, Ont., has been granted permission by the Commissioners of Queen Victoria, Niagara Falls Park, to lay another hydraulic pipe, 18 ft. in diameter, of steel and reinforced concrete, through the park

from the gatehouse at the intake bay to the company's power house below the falls. The cost of the work will be about \$1,000,000.

The La Fayette Mfg. & Supply Company, incorporated with a capital stock of \$100,000, has purchased the farm machinery plant of the Plattner Mfg. & Supply Company, La Fayette, Colo.

Fredk. Z. Phelps, manufacturer of automobile tops and accessories, 1251 Niagara street, Buffalo, N. Y., will build and equip a three-story and basement factory, of brick and steel, at 1292 Niagara street.

Ground has been broken for the construction of a new artificial ice plant to be erected by the Knickerbocker Ice Company, Aurora, Ill., near the corner of Pierce street and Lincoln avenue.

The Fish Systems Company has been incorporated at Indianapolis, Ind., with \$50,000 capital stock, to manufacture electrical and power apparatus, by George L. Fish, Richard C. Davis, John D. Arenson, H. F. Hurster and A. E. Leeson.

A pumping plant for about 5,000,000 gal. daily will be erected by Jefferson, Ohio, if the recommendations of the city engineer are followed.

The Chas. Wolf Packing Company, Topeka, Kan., contemplates improvements this fall and winter to cost about \$100,000. A cold storage plant will be included among the improvements to be made.

H. E. Campbell of Royersford and Eli L. Garber of Littitz, Pa., have been appointed receivers for the Yeager-Hunter Spring City Stone Works, Royersford, Pa.

A zinc mill for concentrates will be constructed by the Hancock Mining Company, near Spring City, Mo.

A pumping plant has been authorized for construction by the citizens of Wolbach, Neb. At Kimball, S. D., a bond issue for the same purpose will be voted on shortly.

The Bodley Mfg. Company, Staunton, Va., is to erect additional buildings between the Baltimore & Ohio and Chesapeake & Ohio railroads for the manufacture of lumber buggies, haul-off gears, trucks, machinery for handling sugar cane, &c. Machinery especially adapted for making the product of the plant has been purchased and power will be supplied by the Blue Ridge Light & Power Company. The plant is about ready for operation.

The Michigan Auto Parts Company, Detroit, Mich., will build a one-story brick addition, 61 x 175 ft., to its factory at Jefferson and Campbell avenues.

The Gurney Ball Bearing Company has been incorporated at Jamestown, N. Y., with a capital stock of \$600,000, to manufacture machinery bearings, ball bearings, &c. F. W. Gurney, A. W. Kettle and W. H. Kidder are the incorporators.

The Clark Motor Car Company, Shelbyville, Ind., has completed plans for a factory building, 150 x 200 ft., one story, and construction work will be commenced at once.

The Ingram-Richardson Mfg. Company, Beaver Falls, Pa., manufacturer of porcelain enameled signs, is making some additions to its plant, including the erection of a one-story building, 75 x 165 ft., of saw tooth construction. The building is to give increased facilities to the iron working department and is to be constructed of concrete, brick and steel. The Penn Bridge Company has the contract for the steel work and Martsoff Brothers of New Brighton, Pa., have the balance of the contract.

The Reineke-Wagner Pump & Equipment Company, Pittsburgh, reports the sale of a number of private water plant installations, one of which was a plant for the Butler Country Club, Butler, Pa.

The Central Mfg. Company, Connersville, Ind., which has for years made a specialty of making buggy and automobile bodies, has begun the manufacture of metal automobile bodies.

The Duncan Electric Mfg. Company, Lafayette, Ind., contemplates the erection of a new factory building which will double the capacity of the plant and will mean an increase of 50 per cent. in the working force.

The Great Western Automobile Company, Peru, Ind., has been incorporated with a capital stock of \$100,000, to manufacture automobiles. Milton Krause, Wm. S. Mercer and R. H. Bouslog are the incorporators.

The Indianapolis Brass Company, Indianapolis, Ind., has increased its capital stock from \$10,000 to \$25,000. M. W. Kelly is president.

The Commissioners of Boone County, at Lebanon, Ind., will receive bids until October 4 for the erection of a courthouse and heating plant. B. F. Herdrich, Lebanon, is county auditor.

Two deep lift suction pumps are to be bought by the city of Champaign, Ill., for an artesian water system.

Consulting Engineers Sheaff and Jaastad, Boston, Mass., and Company Engineer Thomas M. Mather have just finished plans for a third building to be erected at Lakeland adjoining the car repair and car manufacturing building under construction by the Beebe Syndicate, controlling the Rochester, Syracuse & Eastern, Syracuse, Lake Shore & Northern and six other lines. The new building is to be used as a car barn and will have a

storage for 65 large interurban cars. It will be one story, 185 x 240 ft., of brick, steel and concrete construction. Work on construction will be started inside of 30 days.

The American Locomotive Company has sent out invitations for bids on another building to be erected in connection with the Brooks plant at Dunkirk, N. Y. The additional building is to be used as a pattern and storage building and will be three stories, 70 x 235 ft., of brick, steel and concrete construction. Contracts for the building will be awarded in the next 10 days and construction started at once. This is the fourth large building to be erected by the company during the year.

The Seldon Motor Vehicle Company, Rochester, N. Y., has awarded contracts for the first section of its new automobile factory to be erected at University avenue and Probert street. The first building is to be two stories, 100 x 136 ft., with a two-story wing, 30 x 60 ft. Construction will be of brick, steel and concrete. Mr. Seldon, who recently won his case acknowledging his patents as basic patents on all automobiles propelled by gasoline or explosive engines, is associated with the company.

The Leaders-Beers Engineering Company has been incorporated at Rochester, N. Y., with a capital stock of \$10,000, by Rolland E. Persinger and Will A. Shorb of Decatur, Ill., and Le Roy Beers and John N. McFadden of Rochester. The purpose of the company is to engage in a general engineering business and the selling of machinery.

The Imperial Auto Company, Jackson, Mich., is receiving bids on a four-story and basement factory, 101 x 104 ft., of brick and structural iron, which it will erect.

The works of the Guelph Patent Cask Company, Ltd., Honor, Mich., which were recently acquired by the Seymour Peck Company, Chicago, will be considerably enlarged and new machinery installed.

Bids for a steel tower and 70,000-gal. steel tank will be taken this month by the city of Hector, Minn.

The Ohio Motor Works, Toledo, Ohio, has let a general contract for the erection of a three-story factory.

The King Paper Company, Kalamazoo, Mich., has completed plans and awarded a general contract for its new manufacturing plant to be erected at a cost of about \$500,000.

The Reinforced Concrete Pipe Company, Detroit, Mich., F. J. Hecker, president, 913 Union Trust Building, is preparing plans for a manufacturing plant which it will build on Holbrook avenue.

The C. W. Smith Elevator Company, Buffalo, N. Y., manufacturer of electric passenger and freight elevators, has moved its plant from 121 Franklin street to Washington and Scott streets, opposite the Lehigh Valley Railroad station, where it will have increased shop facilities.

The Willamette Iron & Steel Works, Portland, Ore., has been awarded a contract for the building of a steel single screw tug for the port of Portland, which is to be completed within nine months. The company expects to be able to finish the work about a month inside of the contract requirement. The machinery equipment of the tug will consist of one fore and aft compound engine of about 900 hp., and two Scotch marine boilers 10 ft. 6 in. by 11 ft. A towing engine suitable for 1½-in. diameter steel cable, together with ordinary steam capstan and anchor hoist will be installed. The hull and lower house of the tug will be of steel, wood being used only in the pilot house and texas.

A bond issue of \$22,000 has been voted by Taloga, Okla., for the installation of a municipal water works system and the building of a city hall.

The Summitt Engineering Company, 716-719 House Building, Pittsburgh, has completed plans for an addition to the plant of the Delphos Mfg. Company, Delphos, Ohio. The new building will be iron clad, 42 x 134 ft., and the Summitt Engineering Company will equip it with tanks, evaporators, &c., as the addition is to be used as a sulphate of iron plant. A 100-hp. boiler and 25-hp. engine will be required, for which the Delphos Mfg. Company will contract direct. When completed the new building and machinery will be used to convert the waste pickle liquor into sugar sulphate of iron, thus providing a valuable by-product. Work has been commenced and the new department will be ready to operate about December 1.

A 300-ton concentrating and milling plant is to be erected in December by the Big Giant Gold Mining Company, Boise, Idaho.

The plant of the Marion (S. C.) Water, Light & Power Company will be extensively remodeled, involving the probable purchase of new machinery.

New pumping plants have been authorized at Columbia, S. C.; Wakefield, Kan.; South Paris, Maine; Exeter, Ont.; Homestead, Pa.; Underwood, S. D., and Hamilton, Texas.

Construction of a plant for pumping water at Pratt, Kan., will begin as soon as the bonds recently authorized have been disposed of.

The Morgan Vacuum Valve Company has been organized at Rochester, N. Y., and will manufacture a patented specialty such as the name indicates. Plans for a plant are not yet complete.

The Iron and Metal Trades

Record Breaking Pig Iron Production.

Almost a Famine in Steel Bars.

Large Orders for Tin Plate.

Astounding as is the rush of pig iron production into new records in the last few months, it is the promise of still greater outputs in the near future which is fairly staggering. The pig iron statistics for September show a record production of coke and anthracite iron of 2,385,206 gross tons, in 30 days, as compared with 2,248,930 tons in the 31 days of August. Yet this does not measure the progress made. We entered the month of October with active plants having a weekly capacity of 564,885 tons, or at the rate of over 29,750,000 tons, which contrasts with a record production of 25,781,361 tons in 1907. In other words, we are now making pig iron at a rate of 4,000,000 tons larger than the best year the country has ever known.

The steel companies made in September 1,600,839 tons, which includes 1,155,496 tons of the make of the Steel Corporation, whose total September output of all grades of pig iron, including foundry, reached the record of 1,184,370 tons. We may add that the Steel Corporation attained a record also in steel production in September, the total being 1,302,074 tons of ingots.

The whole industry is under tremendous pressure, which would be almost alarming were it not for the fact that we are approaching the season of the year when a good deal of outdoor work is suspended and actual consumption shows a tendency to shrink; in fact, in some branches, which reflect this most closely, notably in the wire trade and in the structural industry, the feeling is gaining ground that there may be even a moderate setback after the fall rush is over and before the spring demand sets in. The latter is expected to be a record breaker.

In some of the leading markets for pig iron there are indications that the rapid rise in prices has somewhat checked buying. Still, some large interests are testing the markets and may close for considerable quantities for forward delivery at an early date. Some additional basic pig for 1909 has somewhat unexpectedly come out in eastern Pennsylvania and sales aggregating about 20,000 tons have been made at \$18, delivered. At least one lot of 5000 tons of basic iron was secured by a Chicago steel plant in the Buffalo District and there has been some inquiry for basic pig in the Central West and in St. Louis.

Middlesbrough No. 3 has been freely offered at \$17.35 to \$17.55, ex ship Philadelphia, duty paid, but we cannot learn that any iron has been actually shipped, except one cargo, which goes to a New England founder.

The international steel rail trade is getting into more satisfactory conditions. The foreign mills are better employed than they have been, and negotiations are in progress involving some good orders in different parts of the world. At home, the St. Paul road has added 20,000 tons to its former orders, carrying the total up to 100,000 tons. A leading system has just placed in the Chicago market an order for 70,000 tons, of which 15,000 tons is Bessemer and 55,000 tons is open hearth. The Tennessee Company has booked an additional 15,000 tons for the Atlantic Coast Line for delivery next year.

There is almost a famine in steel bars, and a lively overflow is coming to the iron bar mills, of which many are in a position to take care of fairly early deliveries. There are many inquiries for steel bars for the first and second quarters of next year. The mills are cautious, and while some are quoting 1.50c., Pittsburgh, for the first quarter, the majority have not yet opened their books. A heavy movement is expected when they do.

The canning and meat packing interests have placed large orders for tin plate for delivery over six months on the basis of \$3.50 per box, base.

The American Sheet & Tin Plate Company is now operating 154 hot tin mills out of a total of 221 effective mills and is running 153 out of 183 sheet mills.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type, Declines in Italics.

At date, one week, one month and one year previous.

	Oct. 6, 1909.	Sept. 29, 1909.	Sept. 1, 1909.	Oct. 7, 1908.
PIG IRON, Per Gross Ton:				
Foundry No. 2, standard, Philadelphia	\$18.50	\$18.50	\$17.75	\$16.75
Foundry No. 2, Southern, Cincinnati	17.75	17.75	16.75	15.75
Foundry No. 2, local, Chicago	19.00	19.00	18.50	16.85
Basic, delivered, eastern Pa.	18.00	18.50	18.00	15.50
Basic, Valley furnace	16.75	16.50	15.50	14.25
Bessemer, Pittsburgh	18.90	18.40	17.65	15.90
Gray forge, Pittsburgh	16.90	16.90	15.65	14.40
Lake Superior charcoal, Chicago	19.50	19.50	19.50	19.50

BILLETS, &c., Per Gross Ton:				
Bessemer billets, Pittsburgh	25.00	25.00	25.00	25.00
Forging billets, Pittsburgh	29.00	29.00	29.00	27.00
Open hearth billets, Philadelphia	27.00	27.60	27.50	26.20
Wire rods, Pittsburgh	31.50	31.50	31.00	33.00
Steel rails, heavy, at mill	28.00	28.00	28.00	28.00

OLD MATERIAL, Per Gross Ton:				
Steel rails, melting, Chicago	17.75	17.25	16.00	14.75
Steel rails, melting, Philadelphia	18.00	17.75	17.25	15.00
Iron rails, Chicago	20.50	20.50	19.00	18.00
Iron rails, Philadelphia	21.00	21.00	20.00	20.50
Car wheels, Chicago	18.50	18.50	17.00	15.25
Car wheels, Philadelphia	17.50	17.00	16.50	15.00
Heavy steel scrap, Pittsburgh	17.75	17.50	17.25	15.00
Heavy steel scrap, Chicago	16.75	16.75	15.50	13.00
Heavy steel scrap, Philadelphia	18.00	17.75	17.25	15.00

FINISHED IRON AND STEEL,				
Per Pound:	Cents.	Cents.	Cents.	Cents.
Refined iron bars, Philadelphia	1.57	1.57	1.50	1.45
Common iron bars, Chicago	1.50	1.55	1.40	1.50
Common iron bars, Pittsburgh	1.55	1.55	1.50	1.40
Steel bars, tidewater, New York	1.66	1.56	1.51	1.56
Steel bars, Pittsburgh	1.50	1.40	1.35	1.40
Tank plates, tidewater, New York	1.66	1.66	1.56	1.76
Tank plates, Pittsburgh	1.50	1.50	1.40	1.60
Beams, tidewater, New York	1.66	1.66	1.56	1.76
Beams, Pittsburgh	1.50	1.50	1.40	1.60
Angles, tidewater, New York	1.66	1.66	1.56	1.76
Angles, Pittsburgh	1.50	1.50	1.40	1.60
Skelp, grooved steel, Pittsburgh	1.45	1.40	1.40	1.45
Skelp, sheared steel, Pittsburgh	1.55	1.50	1.50	1.50

SHEETS, NAILS AND WIRE,				
Per Pound:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, Pittsburgh	2.30	2.30	2.20	2.50
Wire nails, Pittsburgh*	1.80	1.80	1.80	1.95
Cut nails, Pittsburgh	1.80	1.75	1.75	1.80
Barb wire, galv., Pittsburgh*	2.10	2.10	2.10	2.40

METALS, Per Pound:				
Lake copper, New York	13.50	13.50	13.50	13.75
Electrolytic copper, New York	13.00	13.00	13.25	13.50
Spelter, New York	5.90	5.85	5.85	4.85
Spelter, St. Louis	5.75	5.70	5.70	4.70
Lead, New York	4.38	4.38	4.40	4.45
Lead, St. Louis	4.25	4.25	4.30	4.30
Tin, New York	30.50	30.75	30.25	29.50
Antimony, Hallett, New York	8.30	8.30	8.00	7.75
Nickel, New York	45.00	45.00	45.00	45.00
Tin plate, 100 lb., New York	\$3.74	\$3.74	\$3.64	\$3.89

* These prices are for largest lots to jobbers.

Prices of Finished Iron and Steel F.O.B. Pittsburgh.

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 30c.; Birmingham, Ala., 45c. Rates to the Pacific Coast are 80c. on plates, structural shapes and sheets, No. 11 and heavier; 85c. on sheets, Nos. 12 to 16; 95c. on sheets, No. 16 and lighter; 65c. on wrought pipe and boiler tubes.

Structural Shapes.—I-beams and channels, 3 to 15 in., inclusive, 1.50c., net; I-beams over 15 in., 1.60c., net; H-beams over 8 in., 1.70c.; angles, 3 to 6 in., inclusive, ¼ in. and up, 1.55c., net; angles, over 6 in., 1.60c., net; angles, 3 x 3 in. and up, less than ¼ in., 1.70c., base, half extras, steel bar card; tees, 3 in. and up, 1.60c., net; zeos, 3 in. and up, 1.55c., net; angles, channels and tees, under 3 in., 1.45c., base, plus 10c., half extras, steel bar card; deck beams and bulb angles, 1.75c., net; hand rail tees, 2.75c., net; checkered and corrugated plates, 2.75c., net.

Plates.—Tank plates, ¾ in. thick, 6¼ in. up to 100 in. wide, 1.50c. to 1.60c., base. Extras over this price are as follows:

Tank, ship and bridge quality, ¼-in. thick on edges, 100 in. wide, down to but not including 6 in. wide, is taken as base.

Steel plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot, shall be considered $\frac{1}{4}$ -in. plate. Steel plates over 72 in. wide must be ordered $\frac{1}{4}$ -in. thick on edge, or not less than 11 lb. per square foot, to take base price. Steel plates over 72 in. wide ordered less than 11 lb. per square foot down to the weight of 3-16-in. shall take the place of 3-16-in.

Percentages as to overweight on plates, whether ordered to gauge or weight, to be governed by the Association of American Steel Manufacturers' Standard Specifications.

Gauges under $\frac{1}{4}$ -in. to and including 3-16-in. plates on thin edges.....	\$0.10
Gauges under 3-16-in. to and including No. 8.....	.15
Gauges under No. 8 to and including No. 9.....	.25
All sketches (excepting straight taper plates varying not more than 4 in. in width at ends, narrowest end being not less than 30 in.).....	.10
Complete circles.....	.20
Boiler and flange steel plates.....	.10
"A. B. M. A." and ordinary firebox steel plates.....	.20
Still bottom steel.....	.30
Marine steel.....	.40
Locomotive firebox steel.....	.50
Shell grade of steel is abandoned.	
For widths over 100 in. up to 110 in.....	.05
For widths over 110 in. up to 115 in.....	.10
For widths over 115 in. up to 120 in.....	.15
For widths over 120 in. up to 125 in.....	.25
For widths over 125 in. up to 130 in.....	.50
For widths over 130 in.....	1.00

TERMS.—Net cash 30 days. Pacific Coast base, 1.30c. f.o.b. Pittsburgh.

Sheets.—Minimum prices for mill shipments on sheets in carload and larger lots, on which jobbers charge the usual advances for small lots from store, are as follows: Blue annealed sheets, Nos. 3 to 8, 1.65c.; Nos. 9 and 10, 1.70c.; Nos. 11 and 12, 1.75c.; Nos. 13 and 14, 1.80c.; Nos. 15 and 16, 1.90c.; box annealed sheets, Nos. 17 to 21, 2.10c.; Nos. 22 to 24, 2.15c.; Nos. 25 and 26, 2.20c.; No. 27, 2.25c.; No. 28, 2.30c.; No. 29, 2.35c.; No. 30, 2.45c.; galvanized sheets, Nos. 13 and 14, 2.35c.; Nos. 15 and 16, 2.45c.; Nos. 17 to 21, 2.60c.; Nos. 22 to 24, 2.75c.; Nos. 25 and 26, 2.95c.; No. 27, 3.15c.; No. 28, 3.35c.; No. 29, 3.45c.; No. 30, 3.70c. Painted roofing sheets, No. 28, \$1.60 per square. Galvanized roofing sheets, No. 28, \$2.85 per square for $2\frac{1}{2}$ in. corrugations.

Wrought Pipe.—Discounts on steel pipe, $\frac{3}{4}$ to 6 in., in carloads to the largest trade, are 80 and 5 per cent. off list, and on iron pipe, $\frac{3}{4}$ to 6 in., are 75 and 5 per cent. off list.

Boiler Tubes.—Regular discounts, effective from October 1, 1909, on steel and charcoal iron boiler tubes are as follows:

	Steel.	Iron.
1 to $1\frac{1}{2}$ in.....	.49	43
$1\frac{1}{2}$ to $2\frac{1}{4}$ in.....	.61	43
$2\frac{1}{4}$ in.....	.63	48
$2\frac{1}{2}$ to 5 in.....	.69	55
6 to 13 in.....	.61	43
$2\frac{1}{2}$ in. and smaller, over 18 ft. long, 10 per cent. net extra.		
$2\frac{1}{2}$ in. and larger, over 22 ft. long, 10 per cent. net extra.		

Wire Rods.—Bessemer, open hearth and chain rods, \$31.50 to \$32.

Steel Rivets.—Structural rivets, 1.90c., base; boiler rivets, 2c., base, subject to usual extras.

Chicago.

FISHER BUILDING, October 6, 1909.—(By Telegraph.)

Rising prices seem to have temporarily checked the demand for pig iron, the movement last week being comparatively light. At the same time it would appear from the numerous inquiries being received from melters for prices covering second quarter requirements that the throwing open of furnace books for this delivery at prices near the present level would be followed by a heavy buying movement. Selling that far ahead is as yet confined to Northern iron, and the price asked is \$1 a ton over that ruling for shipments up to January 1. Increased shipments of foundry coke are indicative of a larger consumption of pig iron, since melters do not usually stock up with coke far in advance of requirements. Since the introduction and prevalent use of by-product coke for cupola charging, foundries depend even more than formerly upon prompt shipments to supply their wants. The only drawback to the full operation of foundries at present seems to be a scarcity of molders. Price advances on finished material announced since last report include \$2 a ton on box annealed and galvanized sheets and \$2 a ton on merchant pipe and boiler tubes. While the market on bars, plates and shapes is unchanged, so far as prices on current orders are concerned, the few sales that have been made covering first quarter requirements indicate that when prices for this period are formally announced they will be on a basis \$2 a ton higher than those now ruling. This month is likely to establish new records of production in all of the leading mills. Finishing departments are being crowded as hard as the supply of steel will permit. Not much new business is being entered, but this is not of especial significance, as few mills are able to take on additional orders for delivery this year and are generally unwilling to contract ahead. The scrap market is very strong on all grades and prices are higher. Melting steel has tightened up on the strength of a report that heavy purchases were being made for the Gary Works. Such an intimation would at any time be quickly reflected in a firmer holding of such material, and under present conditions is especially potent to this end.

Pig Iron.—Buyers have followed the market up without hesitation to the last advance, which pegged the price of No. 2 Southern foundry at \$15, Birmingham; but from the lull that developed last week it would appear that a good many consumers have paused to consider the situation. The attitude of sellers, however, is uncompromisingly firm, their position being fortified by the belief that even higher prices will yet rule. Last week's transactions, which in the aggregate show a considerable falling off from the week before, included none of notable size. While the buying was largely for first quarter delivery on Southern iron, with some sales of Northern for full first half, there was a fair demand for prompt iron. Enough business has been done at \$15, Birmingham, to establish the market at this figure. The only deviations from this price that may have occurred have had to do with sales for prompt delivery, though none of this character has been definitely located. Outside of an unimportant amount of resale iron that may possibly be had, nothing better than \$15 is being done for first quarter, beyond which time no open quotations are made by Southern furnaces. Prices on first and second quarter iron have been advanced by local furnaces to \$19 and \$19.50, at furnace, respectively, for these deliveries, while \$18.50 at furnace is still being done for last quarter. Owing to the price differential in favor of the Northern product, a large share of business in the Chicago market is going to local interests. An inquiry from a local consumer for 5000 tons of basic, which was put out several weeks ago and later withdrawn, has reappeared. Inquiries for foundry iron are plentiful and shipments are going forward without interruption. Scarcity of molders is interfering with the full operation of many foundries. In a number of instances plants are falling behind in the execution of orders and are unable for lack of help to operate foundries at better than 50 to 75 per cent. of full capacity. Off grade iron is scarce and the nominal spreads between them and No. 2 have narrowed. The following quotations are for October, November and December delivery, f.o.b. Chicago:

Lake Superior charcoal.....	\$19.50 to \$20.00
Northern coke foundry, No. 1.....	19.50 to 20.00
Northern coke foundry, No. 2.....	19.00 to 19.50
Northern coke foundry, No. 3.....	18.50 to 19.00
Northern Scotch, No. 1.....	19.00 to 19.50
Southern coke, No. 1.....	19.85 to 20.35
Southern coke, No. 2.....	19.35 to 19.85
Southern coke, No. 3.....	18.85 to 19.35
Southern coke, No. 4.....	18.35 to 18.85
Southern coke, No. 1 soft.....	19.85 to 20.35
Southern coke, No. 2 soft.....	19.35 to 19.85
Southern gray forge.....	17.85 to 18.35
Southern mottled.....	17.60 to 18.10
Malleable Bessemer.....	18.50 to 19.00
Standard Bessemer.....	19.90 to 20.40
Jackson Co. and Kentucky silvery, 6%.....	20.40 to 20.90
Jackson Co. and Kentucky silvery, 8%.....	21.40 to 21.90
Jackson Co. and Kentucky silvery, 10%.....	22.40 to 22.90

Bars.—In a few instances sales of steel bars have been made covering deliveries during the first three months of next year, the price in such cases being on the basis of 1.50c., Pittsburgh. As a rule, however, the mills are not yet seeking new contracts into next year. Inquiries for first quarter and half requirements are becoming more numerous and it is evident that as soon as the mills are ready to book forward orders a strong buying movement will set in. New orders are light, since the mills are not in position to accept much new business for delivery to January 1. Specifications continue to come out in large volume and all producers are away behind with shipments. The demand for bar iron has grown until the rolling schedules of all the Western mills are well filled. Most of them are still able to accept business for reasonably prompt delivery, and this has a tendency to divert to them some business that would otherwise go to the steel bar mills. Bar iron prices are firmer, and the inside prices quoted are being made only by a few sellers and for desirable specifications. We quote steel bars, 1.58c., hard steel bars, 1.50c. to 1.55c.; bar iron, 1.50c. to 1.55c., all Chicago.

(By Mail.)

Billets.—Buyers of forging billets are not so much concerned about prices as they are in securing material from whatever source. Conditions as to local product are unchanged, there being none for sale in this market. This situation being understood, few inquiries are received by the mills here, most of them going to the Eastern mills. Before the Gary mill can run anywhere near full, more pig-making capacity will have to be blown in; but this will take place in the near future, and between now and the end of the year four more furnaces will be ready for operation.

Rails and Track Supplies.—A large portion of heavy section rail requirements for 1910 have been included in the liberal contracts placed in the past few weeks. The only new business of this kind reported for the last week was 16,000 tons placed by the Chicago, Milwaukee & St. Paul Railroad, in addition to the 75,000 tons secured the previous week by the Illinois Steel Company. The latter interest also booked orders from three lumber roads, aggregating 2500 tons of 60-lb. rails, mainly for delivery this year. Both the No. 1 rail mill at the South Works and the Gary mill are loaded up for practically all they can turn out in the re-

mainder of the year; but light standard sections are being rolled on the No. 2 rail mill, which is not so well filled up. The orders for heavy rails entered for next year's rolling on the South Works and Gary mills totals 465,000 tons. Forward orders for track spikes and bolts have also been very liberal, the contracts secured for next year's delivery amounting to 160,000 kegs of spikes and 60,000 kegs of bolts, of which 77,000 kegs of the former and 25,000 kegs of the latter have been taken the past week or so. Nearly all of the leading Western systems have figured in this buying. While no large orders for light rails are coming out, small lots are fairly numerous, indicating considerable activity in the extension and betterment of industrial roads. We quote standard railroad spikes at \$1.80, base; track bolts, 2.25c., base, all in carload lots, Chicago; light rails, 40 to 45 lb., \$26; 30 to 35 lb., \$26.75; 16, 20 and 25 lb., \$27; 12-lb., \$28. Chicago, less 50c. a ton on lots of 500 tons and \$1 a ton on lots over 500 tons.

Structural Material.—Measured by the amount of new business closed, the structural market is quiet. Doubtless the inability of fabricators to promise prompt execution of orders has something to do with the lull that has temporarily checked the rising volume of demand. The large number of new projects on which figures are being asked indicates, however, that there is further activity ahead in building and other structural using industries. The transactions of the week include a storage house for the Lehigh Valley Coal Company, Superior, Wis., 173 tons, and a fair ground coliseum for Dallas, Texas, 300 tons, taken by the American Bridge Company; an addition to the plant of the N. K. Fairbank Company, Chicago, 150 tons, awarded to Vierling, McDowell & Co.; and a railroad trestle and rock-house for the Hancock Mining Company, Hancock, Mich., secured by the Wisconsin Bridge Company. Slowness of mill deliveries is interfering with the full operation of some fabricating shops, and thus far not much improvement in this respect is noted, although some betterment is looked for soon. At present, however, specifications are coming in as fast as shipments are being made. Except in a few instances, covering material required for specific work, the mills uniformly declare that they have not opened their books for business beyond January 1. We quote plain material from mill at 1.68c., Chicago; from store, 1.90c., Chicago.

Plates.—The demand for universal plates is very heavy and the mills are about as far behind on shipments as on structural shapes. Congestion is not quite so marked in sheared plates, on which deliveries of desirable specifications can be made within three or four weeks. The heaviest orders against contracts are coming from the car shops. The Standard Steel Car Company, which, it is understood, will soon be going again, is only waiting to get material enough on hand to warrant starting up. Specifications from fabricating shops and other sources continue heavy. Sales are being confined to the present year, except in a few special cases, by practically all the mills, and none is reported as quoting prices for delivery further ahead. The market is very firm at current quotations, which represent the minimum. We quote mill prices at 1.68c., Chicago; store prices, 1.90c., Chicago.

Sheets.—The anticipated advance in sheets that was announced last week by the leading interest, as effective September 28, put prices up \$2 a ton, making No. 28 black 2.30c. and No. 28 galvanized 3.35c., Pittsburgh. Blue annealed sheets remain at 1.70c., Pittsburgh, to which price they were recently advanced. The independent mills have all advanced to the same basis, some of them, in fact, including the local interest at Indiana Harbor, having anticipated this action a couple of weeks or more ago. This mill being unable to accept further orders for delivery this year and, not having opened its books for business beyond January 1, is for the time being practically out of the market. A corresponding advance on black and galvanized sheets has been made by the jobbers, who are holding firmly at 2.85c. to 2.95c. for No. 28 Black and 3.90c. to 4c. for No. 28 galvanized.

Merchant Pipe.—Following the general trend of the market, an advance representing \$2 a ton has been announced by the leading interest. This action was not unexpected. Notwithstanding the general belief that prices would be moved up, there had been no considerable anticipatory buying by the jobbers. The new basing discounts on 3/4 to 6 in. black merchant pipe is 79 per cent., with an additional one point and 5 per cent. to jobbers. The usual differential in discounts applies to galvanized pipe. The equivalent basing discount for Chicago delivery is 77.2 per cent.

Boiler Tubes.—Merchant boiler tubes were included in the advance of last week on tubular goods, prices being raised about \$2 a ton. The new discounts now effective are on a basis of 69 per cent. off on 2 1/2 to 5 in., Pittsburgh. The demand for merchant tubes continues light, but the railroads are coming into the market more freely for locomotive tubes. Some fair sized orders were placed this week by various roads to take care of the increased amount of repair work required in preparing motive power equipment for winter service.

Cast Iron Pipe.—Prices on cast iron pipe are this week moved up 50c. a ton, in keeping with the upward trend of pig iron. Among the limited number of transactions comprising last week's business were 1000 tons for the municipal water works system of Cincinnati and 4000 tons of 20 and 24 in. water pipe purchased by a private corporation, the latter for November and December delivery, both lots going to the United States Cast Iron Pipe & Foundry Company. Some inquiries for future delivery are being received, but foundries are not disposed to sell far ahead at the present market in face of the advancing tendency of pig iron. We quote, per net ton, Chicago, as follows: Water pipe, 4 in., \$28.50; 6 to 12 in., \$27.50; 16-in. and up, \$26.50, with \$1 extra for gas pipe.

Metals.—Trade in copper is quiet, being limited to small purchases for current requirements. Prices remain practically stationary and consumers see no advantage in contracting ahead, in view of the heavy surplus of metal yet in sight. There is not much doing in lead, but spelter is more active, and prices, though not quotably higher, are firmer. We quote as follows: Casting copper, 13 1/4c.; lake, 13 3/4c. to 14c., in carloads, for prompt shipment; small lots, 1/4c. to 3/4c. higher; pig tin, car lots, 31 1/4c.; small lots, 33c.; lead, desilverized, 4.45c. to 4.55c., for 50-ton lots; corroding, 4.70c. to 4.80c., for 50-ton lots; in carloads, 2 1/2c. per 100 lb. higher; spelter, 5.85c. to 5.90c.; Cookson's antimony, 10 3/4c., and other grades, 9 1/4c. to 10 1/4c.; sheet zinc is \$7.50, f.o.b. La Salle, in car lots of 600-lb. casks. On old metals we quote: Copper wire, crucible shapes, 13 1/4c.; copper bottoms, 11 1/4c.; copper clips, 12 1/4c.; red brass, 11 1/4c.; yellow brass, 9 1/4c.; light brass, 6 1/4c.; lead pipe, 4 1/2c.; zinc, 4.50c.; pewter, No. 1, 23c.; tin foil, 25c.; block tin pipe, 27c.

Old Material.—Reports are current to the effect that the leading interest is in the market for melting steel to supply the Gary mills, with the result that prices on such material have stiffened up decidedly. It is understood that some purchases have been made for this account, but how heavy they have been is not definitely known, though they are believed to have not exceeded 7500 to 10,000 tons. Owing to the temporary scarcity of steel, it seems not at all improbable that such requirements have developed, but it is hardly likely that these mills will be permanently dependent upon the open market for large amounts of scrap; in the present excited state of the market even moderate demands from this source give a boost to values. The list throughout is strong, such changes as are noted being in the nature of advances. Good prices were realized on the material included in railroad lists closed last week. On that of the Chicago, Burlington & Quincy No. 1 cast brought \$15.65; No. 1 wrought, \$16.25; spring knuckles and couplers, \$15.40, all per net ton; old iron rails, \$20.50; frogs, switches and guards, \$16.90; old wheels, \$18.50, all per gross ton. The following prices are per gross ton, f.o.b. Chicago:

Old iron rails.....	\$20.50 to \$21.50
Old steel rails, rerolling.....	18.00 to 18.50
Old steel rails, less than 3 ft.....	17.75 to 18.25
Relaying rails, standard sections, subject to inspection.....	23.50 to 24.50
Old car wheels.....	18.50 to 19.00
Heavy melting steel scrap.....	16.75 to 17.25
Frogs, switches and guards, cut apart.....	16.75 to 17.25
Shovelling steel.....	16.00 to 16.50

The following quotations are per net ton:

Iron angles and splices bars.....	\$18.00 to \$18.50
Iron car axles.....	21.50 to 22.00
Steel car axles.....	19.25 to 19.75
No. 1 railroad wrought.....	16.00 to 16.50
No. 2 railroad wrought.....	15.00 to 15.50
Springs, knuckles and couplers.....	15.50 to 16.00
Locomotive tires, smooth.....	17.00 to 17.50
No. 1 dealers' forge.....	13.50 to 14.00
Steel axle turnings.....	11.75 to 12.25
Machine shop turnings.....	10.50 to 11.00
Cast and mixed borings.....	7.50 to 8.00
No. 1 busheling.....	13.00 to 13.50
No. 2 busheling.....	10.00 to 10.50
No. 1 bolfers, cut to sheets and rings.....	11.50 to 12.00
No. 1 cast scrap.....	15.25 to 15.75
Stove plate and light cast scrap.....	13.00 to 13.50
Railroad malleable.....	15.25 to 15.75
Agricultural malleable.....	13.50 to 14.00
Pipes and flues.....	12.00 to 12.50

The General Electric Company has received grand prizes (highest award) at the Alaska-Yukon-Pacific Exposition, Seattle, in each class of electrical apparatus in which an exhibit was made by the company. It was ranked first in the following divisions: Apparatus for cooking by electricity, apparatus for heating by electricity, automatic motor starters, arc lamps, bonds, cabinets, circuit breakers, cutouts, fans, indicating instruments, integrating instruments, insulated wires, insulated cables, incandescent lamps, mine locomotives, motor generators, motors for direct current, motors for alternating current, recording instruments, rectifiers (mercury arc), sockets, switches, transformers and wiring devices. General Electric turbines were also entered in the Government exhibit, in which no awards were made.

Pittsburgh.

PARK BUILDING, October 6, 1909.—(By Telegraph.)

Pig Iron.—Following the heavy buying of the last two or three weeks, the market has quieted down and inquiries are mostly for small lots for prompt shipment and from the small consumers. Shipments of pig iron by the furnaces are heavy; consumers are taking out their iron as fast as it can be delivered, and in some cases anticipating shipments. Some of the dealers still have small lots of Bessemer iron coming to them from the furnaces, bought when prices were much lower than they are now, and the furnaces are insisting on this iron being taken out promptly. To find places for it, the dealers are offering this iron at 25c. to 50c. a ton less than the furnaces will accept. Such small lots might be obtained from dealers for prompt delivery on the basis of \$18 at Valley furnace, but practically all the furnaces are asking \$18.50 at furnace. There is very little inquiry for foundry or forge iron, but prices are strong. We quote Bessemer at \$18 to \$18.50 for delivery over the balance of this year, and it is probable that \$18.50 would have to be paid if any considerable amount was wanted. Malleable Bessemer is \$17.25 to \$17.50; basic, \$16.75 to \$17; No. 2 foundry, \$17 to \$17.25, and gray forge, \$16, all at Valley furnace, the freight rate to Pittsburgh being 90c. a ton. We note sales of 2000 tons of basic iron for November and December delivery at \$16.75, Valley furnace.

Steel.—In the present condition of the steel market quotations are to be considered merely nominal. All the mills are behind in deliveries, and there is apparently not enough steel to go around. We quote Bessemer billets, 4 x 4 in., at \$25 to \$25.50; open hearth, \$26 to \$26.50; Bessemer and open hearth sheet bars, \$28, and forging billets, \$29 to \$30, all Pittsburgh, full freight to destination added. Small lots of open hearth billets and open hearth sheet and tin bars for spot shipment have been sold at higher prices. Sheet bars have sold at \$28, and forging billets at \$30 for prompt shipment.

(By Mail.)

The steel trade, in this district at least, has reached the point where the large steel interests are more concerned in getting ordered material turned out than they are in seeking new business. For three or four months there has been a steady flow of orders into the mills, with the result that they are now simply swamped, and several of the largest steel concerns are now in the position that they cannot make any definite promises of deliveries. Buyers are insisting on placing orders, and the only way to keep tonnage away is to name prices that are practically prohibitory, and this is being done. The minimum price to-day on structural material is 1.45c., but neither of the local producers would take orders and promise deliveries within a reasonable time. Plates and steel bars are about in the same shape and sheets and pipe are rapidly getting there. To put it in a nutshell, the local steel mills are as badly congested with tonnage as they have ever been, and the situation is getting worse as regards deliveries. It seems no longer to be a question of price but where to find mills that can make prompt deliveries of material. Present conditions are not confined to the steel market alone, but also to pig iron. A number of sales of Bessemer pig iron for delivery this year have been made at \$18.50, Valley furnace, or \$19.40, Pittsburgh. It is true, however, that most large consumers, who are producers of pig iron themselves, have been compelled to come in the market within the past two months, and have bought large tonnages of Bessemer iron at prices ranging from \$17 up to \$18, at furnace. The smaller consumers who have not covered are now compelled to pay still higher prices for their iron, and the market is altogether in the sellers' favor. Some in the trade believe that the pace has been too fast and cannot be maintained, while others point out the fact that the present congested condition of the steel mills has come with very little help from the railroads. Within the past week some large contracts for rails have been placed, but details of these contracts and the tonnages involved have not been officially given out. The whole situation is decidedly buoyant, and it would seem that higher prices, especially where reasonably prompt deliveries are wanted, are practically certain. The only official advances made in prices during the week were one point, or \$2 a ton, on steel pipe, and two points, or \$4 a ton, on charcoal iron tubes.

Ferromanganese.—In sympathy with other materials, prices on ferro are decidedly stronger. Foreign 80 per cent. for prompt shipment is quoted at \$43, seaboard, \$44 for last quarter, and \$45 and higher for first quarter and first half of next year. The freight to Pittsburgh is \$1.95 a ton.

Ferrosilicon.—Prices are very firm and the demand is active. The feeling is that ferrosilicon will command higher figures in the near future. We quote 50 per cent. ferro-

silicon at \$64 to \$64.50, f.o.b. Pittsburgh, and blast furnace ferrosilicon, delivered Pittsburgh, at \$23, for 10 per cent., \$24 for 11 per cent, and \$25 for 12 per cent.

Muck Bar.—An inquiry came out to-day for 1000 tons of muck bar for October and November delivery, and this will likely be placed in a day or two. The higher prices ruling for forge iron are reflected in muck bar; best grades, made from all pig iron, are now held at \$29.50 to \$30, f.o.b. Pittsburgh.

Wire Rods.—Some inquiry is in the market for rods for next year's delivery, but the makers refuse to entertain offers of business at present prices for delivery beyond this year. Some of the contracts placed by leading consumers of rods when prices were lower have been pretty well taken out and some active inquiries are looked for. We quote Bessemer, open hearth and chain rods at \$31.50 to \$32, f.o.b., Pittsburgh, most sellers asking the higher price.

Skelp.—A leading consumer has been in the market recently, and has bought quite a large tonnage of grooved iron skelp for delivery over the next three or four months. The mills are asking higher prices, and we now quote grooved steel skelp 1.45c. to 1.50c.; sheared, 1.55c. to 1.60c.; grooved iron plates, 1.75c. to 1.85c., and sheared iron plates at 1.90c. to 1.95c., all for ordinary widths and gauges, f.o.b., Pittsburgh.

Steel Rails.—The Harriman interest has placed 12,000 tons for extensions to its Mexican road, and unofficial advices are that the Pennsylvania Railroad has placed 200,000 tons, the Missouri Pacific 10,000 tons, Chicago, Milwaukee & St. Paul 75,000 tons, the Northern Pacific 10,000 to 15,000 tons, and the Chicago Great Western 20,000 tons. If these contracts have actually been placed, details concerning them and the tonnages to be rolled by the local mill have not yet been received here. The Carnegie Steel Company entered orders and received specifications in the past week for about 1600 tons of light rails. We quote steel axles at 1.65c. to 1.70c., and splice bars, 1.50c., at mill, Pittsburgh. Light rail prices are as follows: 8 to 10 lb., \$32; 12 to 14 lb., \$29; 16, 20 and 25 lb., \$28; 30 and 35 lb., \$27.75, and 40 and 45 lb., \$27, Pittsburgh. These prices are for 250-ton lots and over, and for small lots premiums of 50c. per ton and more are being paid. We quote standard sections at \$28, at mill.

Plates.—The Rutland Transit Company has placed an order with the American Shipbuilding Company for two small freighters, taking about 4000 tons of plates and shapes, which will be rolled by the Carnegie Steel Company. The plate mills are badly congested with work ordered and are practically refusing to accept new orders with deliveries specified. The Carnegie Steel Company and Jones & Laughlin Steel Company have an enormous tonnage of plates on their books and are behind in deliveries. Mills that can make reasonably prompt deliveries of plates have no trouble in getting 1.50c. to 1.55c., and some small sales have been made for prompt delivery at 1.60c., but these are exceptional. We quote ½-in. and heavier plates at 1.50c. to 1.60c., Pittsburgh, prices depending altogether on deliveries wanted by the buyer and the quantity involved.

Structural Material.—While there is a lull in new contracts, it is the natural outcome of three or four months of unusual activity. The engagements of the structural mills in the Pittsburgh District are such that they cannot possibly take on any more contracts for delivery this year, and they have a good deal of tonnage on their books running into next year. Deliveries are hard to obtain, and premiums of \$2 a ton and more are being paid on orders carrying specified shipments. The Jones & Laughlin Steel Company has taken about 1700 tons of plates and shapes for the Union Dock Company for new ore docks at Ashtabula, and the Riter-Conley Mfg. Company has taken about 1200 tons for steel buildings for the McKeesport Tin Plate Company and 400 tons for a runway at Depew, N. Y. Steel fabricators are complaining very much about slow deliveries by the mills, and work is being retarded a good deal on this account. We quote beams and channels up to 15-in. at 1.50c. to 1.60c., f.o.b. Pittsburgh, prices, as in plates, depending largely on deliveries wanted and the tonnage.

Sheets.—The advance of \$2 a ton on black and galvanized sheets, effective September 28, and the advance of \$1 a ton on blue annealed sheets, made a few days before, are both being absolutely maintained, and all traces of cutting in prices have disappeared. The mills are congested with orders, which still keep coming in and for large tonnages, and they are considerably behind in deliveries. It is more than two years since the sheet trade was as active as it is at present, and if sheet bars continue to advance higher prices on sheets seem assured. Prices on blue annealed sheets, now in effect by the American Sheet & Tin Plate Company and other producers, are as follows: No. 3 to 9, 1.65c.; Nos. 9 and 10, 1.70c.; Nos. 11 and 12, 1.75c.; Nos. 13 and 14, 1.80c., and Nos. 14 and 15, 1.90c. One pass box annealed No. 28 black sheets are now 2.30c. and No. 28 galvanized 3.35c., at mill. We quote corrugated roofing sheets at \$1.60 per square for painted and \$2.85 for galvanized 2½-in. corrugations. Jobbers charge the usual advances over

these prices for small lots from store. The American Sheet & Tin Plate Company is steadily increasing its active list of sheet mills, and this week is operating 153 hot sheet mills out of 186 serviceable mills. The idle sheet plants are Bridgeport, 23 mills; Canton, 5 mills; while 5 mills in other works are idle for repairs. The company started this week its Mercer, Pa., plant, which contains 5 hot sheet mills, and will start in a week or 10 days its Canton, Ohio, plant, which also contains 5 hot mills.

Tin Plate.—The American Sheet & Tin Plate Company is operating this week 154 hot tin mills out of 221 serviceable mills, and expects to start some more mills in the very near future. This company and other tin plate makers are now entering contracts for tin plate for delivery into next year at the price of \$3.50 per base box, which became effective September 28. In the last week, or since the new price was announced, some very heavy contracts for tin plate have been placed for delivery over the next six months from the canning and meat packing interests, and the mills are already assured of practically full work through the winter months. The market is very firm and we quote 100 lb. cokes at \$3.50 per base box, f.o.b. Pittsburgh.

Bars.—There is a famine in the supply of steel bars for reasonably prompt delivery, and mills rolling steel bars that are in position to make fairly prompt shipments can get 1.55c. to 1.60c. at mill, and a good deal of tonnage has been sold at these prices. Several of the larger steel bar mills have entered a good deal of tonnage for shipment into first quarter of next year, and the leading makers have very heavy tonnages on their books, with specifications coming in at an almost unprecedented rate. The bar iron mills are also getting behind in deliveries and prices are very firm. We quote steel bars at 1.50c. to 1.60c., prices depending altogether on the tonnage involved in the order and deliveries wanted by the customer. Iron bars are also higher, and we quote these at 1.55c. to 1.65c. Like steel bars, prices on iron bars are governed largely by the size of the order and deliveries wanted by the customer.

Hoops and Bands.—New orders are coming in freely, and specifications against contracts placed some time ago at lower prices than are ruling now are being received in good volume, and shipments by the mills on both hoops and bands are heavy. Premiums are being paid for prompt deliveries. We quote hoops for forward delivery at 1.50c., while for reasonably prompt delivery 1.60c. to 1.65c. is being obtained. Steel bands are slightly higher and we quote at 1.40c. for forward delivery and 1.45c. to 1.50c. for prompt shipment.

Spikes.—A number of leading railroads are trying through their purchasing agents to close contracts for spikes for next year's delivery at present prices, but the spike makers refuse to entertain such offers, being practically certain that the market will be higher in a short time. In fact, some makers of spikes are already getting 5c. to 10c. per keg premiums over the regular prices for prompt delivery. The minimum of the market on railroad spikes, $4\frac{1}{2}$ x 9-16 in. and larger, is \$1.70, and on small spikes \$1.75, in carload and larger lots, with 5c. advance for less than carloads. For prompt delivery some makers are able to obtain slightly higher prices.

Rivets.—Prices are very firm, and the demand is heavy. If raw material continues to advance, higher figures on rivets in the near future are not improbable, and some makers are refusing to accept contracts for delivery ahead at present prices. We quote structural rivets, $\frac{3}{4}$ in. and larger, at 1.90c., base; cone head boiler rivets, $\frac{3}{4}$ in. and larger, 2c., base; $\frac{3}{4}$ in. and 11-16 in. take an advance of 15c., and $\frac{1}{2}$ in. and 9-16 in. take an advance of 50c.; lengths shorter than 1 in. also take an advance of 50c. Terms are 30 days, net cash, f.o.b. mill.

Merchant Pipe.—On October 1 prices on steel pipe were advanced one point, or \$2 a ton, and on charcoal iron boiler tubes two points, or \$4 a ton. Some in the trade believe this is only a forerunner of further advances, and intimations are made that about October 15 steel pipe may be advanced one or two points more. The market is very firm, and several mills are refusing to accept business ahead, believing that prices will be higher in the near future. The Monongahela Natural Gas Company has placed a contract for 15 miles of 16-in. steel pipe, and the Manufacturers' Light & Heat for 5 miles of 10-in. The National Tube Company has received a contract from the Barnsdale interests for 40 to 50 miles of pipe, ranging from 8 to 16 in. in size. The official discount on black steel pipe, $\frac{3}{4}$ to 6 in., is now 80 and 5, and on iron pipe, $\frac{3}{4}$ to 6 in., 75 and 5 in carload and larger lots to the largest trade. It should be noted that these prices are absolutely minimum, and are only made to the large trade in carload and larger lots, jobbers charging the usual advances to the smaller trade for shipments from store.

Boiler Tubes.—The demand is more active than for some time, and prices on steel boiler tubes have been advanced one point, or \$2 a ton, and on charcoal iron tubes two points, or \$4 a ton, the advances being effective from October 1. Not much new business has been placed at the higher prices, but consumers are specifying liberally on con-

tracts taken before the advance was made. The table of discounts on steel and iron tubes now in effect is given elsewhere in this issue.

Iron and Steel Scrap.—The whole scrap market is very active. The new demand is heavy and a good deal of scrap is being sold by dealers to consumers. The demand for heavy steel scrap, bundled sheet scrap and car wheels is particularly strong. The scrap lists of the Pennsylvania Lines West closed October 1, and high prices were paid for the whole list. It is stated that heavy steel scrap went at a little better than \$18, delivered Steubenville and Alliance. The scrap lists of the Pennsylvania and the Philadelphia & Reading close October 13, and the Central Railroad of New Jersey and the Baltimore & Ohio lists close October 10. The Erie and New York Central lists close this week, and local dealers have bid higher prices on the scrap offered by these roads than for some months. A producer of bundled sheet scrap in the Wheeling District has sold its output for the rest of this year, about 1000 tons a month, at \$15.55, Wheeling, or \$16.55, Pittsburgh. A tin plate concern in the same district has sold its tin scrap for the balance of the year at about \$15.40, at mill. Prices are very firm, and dealers are quoting \$17.75 to \$18 on heavy steel scrap for delivery at Follansbee, Sharon, Monessen, Pittsburgh, Brackenridge and Steubenville. A number of sales of heavy steel scrap, involving good-sized tonnages, have been made at \$18, delivered at above points. Cast iron borings are firm at \$11.25 to \$11.50; bundled sheet scrap, \$16.25 to \$16.50; low phosphorus melting stock, 0.04 and under, \$21.50; No. 1 cast scrap, cupola sizes, \$17 to \$17.25; No. 2, \$16 to \$16.25; sheet bar crop ends at shipping point, \$19 to \$19.50; No. 1 railroad malleable scrap, \$16.75 to \$17; grate bars, \$14.25 to \$14.50; rerolling rails, delivered at Cambridge and Newark, Ohio, \$18.25 to \$18.50; steel axles, \$22; locomotive axles, \$28 to \$28.50; iron axles, \$27 to \$27.50; No. 1 bushing scrap, \$16.50 to \$16.75; No. 2, \$13.50 to \$13.75; old car wheels, \$19 to \$19.25; machine shop turnings, \$13 to \$13.25; No. 1 railroad wrought scrap, \$18.50 to \$19. These prices are all per gross ton, f.o.b. Pittsburgh, unless otherwise noted. We note sales of about 2000 tons of turnings at \$13 to \$13.05, Pittsburgh; 300 tons of old car wheels at \$19 to \$19.05, Pittsburgh; 4000 tons of heavy steel scrap at \$17.75 to \$18, most of it at the latter price, and 1000 tons of crop ends at \$20, delivered.

Coke.—There is a good deal of inquiry for furnace coke for shipment over the first half of next year, and several large contracts have been closed on the basis of \$2.90 per net ton, at oven. It will probably be only a short time until furnace coke is \$3 a ton or higher for first half of the year delivery; two prominent makers are now holding their coke at that price. For this year's delivery small lots of furnace coke might be picked up at \$2.80 to \$2.90, at oven. There is not a great deal of difference in the prices now being quoted for furnace and foundry coke, and we note that 72-hour standard makes of foundry coke for this year's delivery are held at \$2.75 to \$3 per net ton, at oven, and for next year's delivery from \$3 and up to \$3.50 is being quoted. It is stated that some of the blast furnace operators will go slow in the matter of making contracts for their furnace coke for next year until they are sure that present prices will be held. There is a scarcity of labor in the Connellsville and other coke regions, and the output of coke is being restricted on this account. The production of coke in the Upper and Lower Connellsville regions last week was about 425,000 tons, practically the same as in the previous week. If enough men could be obtained, it is probable that the output of coke would exceed 450,000 tons per week.

Birmingham.

BIRMINGHAM, ALA., October 5, 1909.

Pig Iron.—The schedule of \$15, Birmingham, for No. 2 foundry, and applicable to shipments for the remainder of this year and the first quarter of 1910, has been established by the furnace interests. There is no record of recent commitments for the first quarter at lower figures than the established schedule; for shipments to cover the entire first half no quotation has been adopted. The furnace interests are in no case solicitous of additional orders. One of the large concerns will only quote on a stipulated tonnage and all offers are subject to prior sale, which is the method adopted by merchant interests. The demand for comparatively early shipments has been met largely in the activity of some weeks past and the aggregate tonnage engaged the past week is small, by reason of the indisposition of the trade generally to take hold for advanced deliveries in quantities of consequence. Among the sales reported lots of 750 and 500 tons, each for the first quarter, are most significant. This tonnage was engaged at \$15, Birmingham, as were lots of 250 and 100 tons, each for last quarter shipment. The major portion of the aggregate sold during the week for shipment prior to January 1 was probably at figures representing a slight departure from a \$15 basis. This price has applied to one or more brands, but only a certain trade has been

avored with the concession. The movement from all furnace yards reflects further improvement in the foundry trade generally, and the theory that an improvement is represented is substantiated by the fact that recent efforts of a large producer to have delivery of tonnage covered by specifications in hand cover a longer period were unsuccessful. It is generally conceded that all furnace companies will have to carry over into the new year orders for considerably more iron than has been contemplated, notwithstanding the material addition soon to be made to the rate of production.

Cast Iron Pipe.—The prices considered in recent transactions, which mainly involved comparatively small lots, represent an advance over prices of one week ago and the aggregate of engagements is fairly satisfactory. Latest developments are without specific information as to additional lettings for the near future, but it is understood that the placing of bonds by several Southern cities will result in a good demand from such sources. The inquiry from the Middle West is very encouraging, and as the producing capacity is well provided for during the winter months with orders actually in hand, it is expected that by early spring an advance in price of water pipe in sympathy with the advance in cost of raw material will have been effected. We quote water pipe as follows, per net ton, f.o.b. cars here: 4 to 6 in., \$26; 8 to 12 in., \$25; over 12 in., average \$24, with \$1 per ton extra for gas pipe. The prices being received for comparatively small lots probably represent an average of \$1 per ton higher than the above.

Old Material.—Dealers generally are disposed to hold material on yards for higher prices than are being offered and as a result the aggregate tonnage sold last week is probably smaller than for the week previous. A good demand for wrought iron and steel scrap is still experienced, with the supply of stove plate and light cast quite inadequate for foundry requirements. The tonnage recently offered by mine and furnace operators has been readily marketed to consumers and the aggregate of accumulations in this district is not increased. We quote dealers' asking prices as follows, per gross ton, f.o.b. cars here:

Old iron rails.....	\$17.00 to \$17.50
Old iron axles.....	18.50 to 19.00
Old steel axles.....	16.50 to 17.00
No. 1 railroad wrought.....	13.50 to 14.00
No. 2 railroad wrought.....	11.50 to 12.00
No. 1 country wrought.....	11.00 to 11.50
No. 2 country wrought.....	10.50 to 11.00
No. 1 machinery.....	12.00 to 12.50
No. 1 steel.....	12.00 to 12.50
Tram car wheels.....	11.50 to 12.00
Standard car wheels.....	13.00 to 13.50
Light cast and stove plate.....	11.50 to 12.00
Cast borings.....	6.00 to 6.50

Philadelphia.

PHILADELPHIA, Pa., October 5, 1909.

A somewhat better movement, both in pig iron and some classes of finished material, is reported. The buying has been of a miscellaneous character, the smaller buyers having entered the market more aggressively. Some sellers of foundry iron have booked quite fair aggregates. A little better movement in basic iron for this year's delivery is noted. The advance in the price of pig iron appears to have been checked here. Finished material prices, however, still show an upward tendency, but while advances have been made by some mills the higher range of prices has not yet become general. Deliveries on pig iron are more freely made, but on finished materials are steadily tightening and premiums are asked and paid for prompt deliveries of sheets. The coke market is strong, and prices are steadily advancing; the supply available appears at the time to be scanty. The undertone of the whole market is strong.

Pig Iron.—The volume of business the past week has been somewhat heavier, due to the fact that a large number of the smaller buyers of foundry and other grades of pig iron have come into the market. While the individual transactions have generally been small, running up to a few hundred tons, the total sales made by some interests have been quite good. The bulk of the business has been for deliveries in the balance of the year, although on some of the larger sales the shipments extend into the early portion of 1910, there being a disposition shown by consumers to purchase for as far ahead as possible, although few sellers appear willing to accept orders for any extended shipment. The heavier buyers of foundry iron—except, probably, the cast iron pipe foundries, who are practically always in the market at their idea of prices—are pretty well covered for their near future requirements, and but little inquiry comes from buyers of that class. Foundry iron prices seem to be pegged, for the time, at \$18.50 to \$19 for No. 2 X for the remainder of the year, and \$19 to \$19.50 for delivery in the first quarter, at which prices quite a number of sales have been made, the largest being 1000 tons for delivery October to June, that which is shipped this year being on the \$18.50 basis, while the shipments in 1910 are to be on the \$19 basis. The probability of the importation of foreign foundry iron has had a tendency to check any farther sharp advance in

prices of domestic brands. There has been considerable iron offered on a basis of \$17.35 to \$17.50, ex-ship, duty paid, for No. 3 Middlesbrough, but no purchases can be traced, and it is not believed that any heavy buying will set in as long as domestic iron can be obtained at the present level. There has been little business done in Virginia foundry iron. Prices are firm, at \$16 to \$16.50, at furnace, the latter price now being the minimum quoted by the leading interest for No. 2 X foundry. At the present range of prices Southern foundry iron finds no market here. Forge iron continues very strong, with prices showing an upward tendency. Makers have little of this grade to offer and sales have been few. A sale of 600 tons for mill purposes is reported at \$17.55, delivered, November-December shipment. An inquiry, however, is before the trade for 2500 tons, delivery 100 tons a day, from an Eastern mill. A better demand for basic iron has developed. Several mills had inquiries out for this grade, for delivery the balance of the year, and two contracts were closed, one for 10,000 tons, shipment in the next four months, at \$18, delivered, and another for 4000 tons, delivery in the next 60 days, at the same price. From the readiness in which this iron came out it would seem that increased production had given some makers a greater available quantity of this grade for delivery this year than had been generally anticipated. It would also appear, from the price at which these sales were made, that there is no disposition to raise prices to an unreasonable level, at which importations of foreign basic iron would be permissible. There has been considerable feeling of the market regarding low phosphorus iron. Sellers, however, show no disposition to book orders for standard grades at low prices. The lots placed have, therefore, been limited, although one sale of something less than 1000 tons is reported, for shipment outside this territory, at a price equal to \$22.50, delivered here. The whole tone of the market continues strong, although it would seem as if the backbone of the upward rush in prices in this locality had been broken. Quotations show no material change, the following range being named for deliveries in buyers' yards, eastern Pennsylvania and nearby points, during the remainder of the year, an advance of 50c. a ton for deliveries in the early portion of next year being customary:

Eastern Pennsylvania, No. 2 X foundry.....	\$18.50 to \$19.00
Eastern Pennsylvania, No. 2 plain.....	18.00 to 18.50
Virginia, No. 2 X foundry.....	18.75 to 19.50
Virginia, No. 2 plain.....	18.50 to 19.00
Gray forge.....	17.50 to 17.75
Basic.....	18.00 to 18.50
Low phosphorus.....	22.00 to 22.50

Ferromanganese.—A transaction covering 2000 tons for shipment during the last half of 1910 for delivery outside of this district is reported at \$43.50, Baltimore, but sales for delivery in this territory have been light. Prices show considerable variation, due to the fact that there are still some sellers who are said to be willing to accept what are considered low prices for reasonably early delivery. For shipment during the next six months \$43 to \$44, Baltimore, about represents the market, although some sellers name considerably higher prices.

Billets.—The bulk of the business has been in small lots for comparatively early delivery. Order books are now pretty well filled, and there is no disposition to take on large lots at present prices, which range from \$27.60 to \$28.60, delivered in this vicinity, for prompt ordinary rolling steel. Forging steel has been somewhat more active, although the quantities sold have not been large. Prices for the latter grade are higher, \$30 to \$32 being named, dependent on individual conditions. The usual extras apply for high carbons and special sizes.

Plates.—The tonnage booked by Eastern mills in the month of September was hardly as large as in the previous month. They are, however, fully engaged and booked well ahead on orders, particularly on universal plates. Since the first of the month, however, a better volume of business has developed, including some round lots of bridge and car plates. Prices are moving upward, and some mills now quote 1.75c., delivered, for business of a miscellaneous character, although 1.65c. can still be done for prompt ordinary plates if the quantity and specifications are considered desirable. Mills still refuse to contract, but will accept orders with definite specifications on which deliveries extend into the early portion of next year.

Structural Material.—Very few heavy propositions outside of those already reported have developed, the bulk of the business coming out here being of a miscellaneous character, which, however, aggregates a fair total. Mills are pretty well sold ahead, and prompt deliveries are frequently hard to get. The tendency of prices is upward, and while 1.75c., delivered, is named by some makers for plain material for early shipment, this price can be shaded, the usual range being from 1.65c. to 1.75c., dependent upon specifications.

Sheets.—The demand is still very active and mills readily obtain premiums ranging from \$1 to \$2 a ton, dependent on conditions, for prompt deliveries. Order books are well filled and sellers are not very anxious for business, particu-

larly for extended shipments. Quite a scarcity has developed in some grades and sizes, and, while the following range of prices is quoted for reasonably early shipment, quotations are subject to change without notice: Nos. 18 to 20, 2.50c.; Nos. 22 to 24, 2.60c.; Nos. 25 and 26, 2.70c.; No. 27, 2.80c.; No. 28, 2.90c.

Bars.—A good volume of business continues to be transacted. Mills are fairly well occupied and show little disposition to accept large lots at present prices, or to book contracts for extended delivery. Prices are firm, 1.57c. to 1.62c. being named for ordinary refined iron bars for prompt delivery. A sale of a round lot of test bars, subject to railroad specifications, is reported at 1.75c., mill. Steel bars continue active, and prices show an upward tendency, 1.55c. to 1.65c. being named for early delivery in this district.

Coke.—Prices continue to advance and many sellers decline to make quotations for extended delivery. Prompt coke is scarce. Sales have not been heavy, owing, usually, to the buyer's inability to get the quantity or brand desired. Furnace coke for this year's delivery is quoted at \$2.70 to \$2.90 per net ton, at oven, with foundry at \$2.85 to \$3. For next year's delivery prices as high as \$3 for furnace and \$3.15 for foundry coke have been named. For delivery in buyers' yards in the next three months, the following range of prices per net ton is named:

Connellsville furnace coke.....	\$4.95 to \$5.15
Foundry coke.....	5.10 to 5.25
Mountain furnace coke.....	4.55 to 4.75
Foundry coke.....	4.70 to 4.85

Old Material.—There has been a fair volume of business transacted, principally in small lots for prompt shipment. The market is strong, and advances are noted in the prices of the leading grades. The associated mills still name \$18, delivered, as their price for heavy melting steel, and claim to be getting satisfactory supplies at the present time. Outside mills and brokers are understood to be paying as high as \$18.50 for moderate lots of heavy melting steel. Quite a movement is to be noted in machinery cast scrap, with prices advancing sharply. Some grades of rolling mill scrap are higher, as are also several of the leading specialties. The following quotations, while nominal to a certain extent, are named for early delivery in buyers' yards, eastern Pennsylvania and nearby points:

No. 1 steel scrap and crops.....	\$18.00 to \$18.50
Low phosphorus.....	22.00 to 22.50
Old steel axles.....	23.50 to 24.50
Old iron axles.....	29.00 to 30.00
Old iron rails.....	21.00 to 22.00
Old car wheels.....	17.50 to 18.00
Choice No. 1 R. R. wrought.....	20.50 to 21.00
Machinery cast.....	16.75 to 17.25
Railroad malleable.....	17.00 to 17.50
Wrought iron pipe.....	17.50 to 18.00
No. 1 forge fire scrap.....	16.00 to 16.50
No. 2 light iron.....	10.00 to 10.50
Wrought turnings.....	15.00 to 15.50
Stove plate.....	14.00 to 15.00
Cast borings.....	13.00 to 13.50
Grate bars.....	14.50 to 15.00

Cleveland.

CLEVELAND, OHIO, October 5, 1909.

Iron Ore.—The movement during September, for a second month this season, passed the 7,000,000-ton mark, although the shipments fell off 142,214 tons as compared with August. The shipments in September were 7,050,985 tons. The total this season up to October 1 was 29,639,533 tons, which is 919,673 tons behind the movement to October 1, 1907, the record-breaking year, when the total shipments for the season were 41,288,755 tons. To equal the 1907 record the mines will have to send down nearly 12,000,000 tons of ore from October 1 to the end of the season. The present indications are that this will be done. Work is being rushed with all possible speed in all the Lake Superior mining districts, and the maximum output will be produced from now till the end of navigation. Ore firms have such a large booking of orders that it will be necessary to keep the mines working to their limit to get out the ore that has been sold for shipment before navigation closes. There is still some demand for ore in small lots, but all producers are well sold up and very little is available. One interest reports the sales of lots aggregating 35,000 tons during the week. Not a foot of dock space is left and furnacemen who are buying additional ore are compelled to arrange to have it sent direct to the furnace yards. Prices at Lake Erie docks, per gross ton, are as follows: Old range Bessemer, \$4.50; Mesaba Bessemer, \$4.25; old range non-Bessemer, \$3.70; Mesaba non-Bessemer, \$3.50.

Pig Iron.—Foundry iron is less active than it has been, but there is still a fair volume of buying. It seems that the large majority of the consumers in this territory have covered for at least a portion of their first half requirements. Prices are very firm. There is a disposition among furnacemen, however, as soon as they have taken on a fair tonnage for next year's delivery, to advance their prices, and thus temporarily withdraw from the market and wait for a further advance, which they expect will come. For the bal-

ance of the year No. 2 foundry is firm at \$17 to \$17.50, Valley furnace, and \$17.25 to \$17.50 for the first quarter and half. Some Valley interests are asking \$18 as their minimum for the latter delivery, and local furnaces are now holding strictly to \$18, at furnace, for No. 2 for any delivery. One interest reports sales from local furnace during the week, aggregating about 7000 tons, for the first half, at prices ranging from \$17.50 to \$18 for No. 2. We note the sale of 1500 tons of No. 2 at \$17.25, Valley furnace, for nearby delivery for the balance of the year, and 500 tons by a local furnace for the first half for delivery in the immediate territory at \$18, at furnace, for No. 2. Another Cleveland interest reports the sale of several lots of foundry iron, the largest being 3000 tons. Bessemer is very firm at \$18 for the balance of the year, and \$18.50 asked for the first half. An important interest is in the market for 25,000 tons of Bessemer for the balance of the year delivery. Among the foundry iron inquiries is one from the Barberton plant of the Babcock & Wilcox Company for 2000 tons for the first half. For the balance of the year we quote, delivered, Cleveland, as follows:

Bessemer.....	\$18.90
Northern foundry, No. 1.....	\$18.65 to 18.90
Northern foundry, No. 2.....	18.15 to 18.40
Northern foundry, No. 3.....	17.65 to 17.90
Southern foundry, No. 2.....	18.85
Gray forge.....	16.50 to 16.75
Jackson County silvery, 8 per cent. silicon.....	20.55

Finished Iron and Steel.—The demand continues good in all finished lines, although the volume of specifications shows some falling off as compared with last week, this being due to the fact that there was a rush to get in specifications on contracts that expired October 1. Consumers of steel bars, plates and structural material appear anxious to cover for their first half requirements, but mill agencies do not seem eager to take on contracts for delivery after January 1. Some of the mills, however, are taking such contracts from their favored buyers. For delivery in the first quarter, 1.45c., Pittsburgh, is now quoted as the minimum price for steel bars. For delivery the balance of the year 1.40c. to 1.50c. is being quoted, the price depending on quantity and delivery. On plates and structural material one mill agency is quoting 1.60c., Pittsburgh, for the first half, and has closed some contracts at that price. The demand for plates in small lots continues heavy, and 1.60c., Pittsburgh, appears to be the minimum price for quick delivery. Where prompt deliveries cannot be made 1.55c. appears to be the ruling quotation. The demand for structural material in small lots for early delivery is very heavy, but no projects are in sight requiring a large tonnage. Sheets are in good demand and prices are firm. Mills are well filled with orders. Many buyers are anxious to contract for the first quarter, and some of the independent mills are asking an advance of \$1 to \$2 a ton on contracts. Forging plants have become quite busy, and the demand for forging billets is good. For car lots mills are not having trouble in getting \$30 to \$31, Pittsburgh, for quick shipment. The demand for iron bars continues active and prices are firm at 1.55c. to 1.60c., Cleveland. There is a good demand for light rails in car lots and under. Prices are not uniform, but are firmer, one or two mills having advanced their quotations. The Lake Shore Railroad has an inquiry out for 1200 kegs of spikes. The general situation regarding deliveries shows no change. Consumers are crowding mills for shipments, and some of the mills are so well filled up that they are declining to take on any additional business for this year's delivery.

Old Material.—The market is fairly active. Prices on several grades have further advanced 50c. a ton. Local steel mills have bought to some extent during the week, but the movement is being restricted, owing to the fact that dealers and consumers cannot get together on prices for steel making scrap. Dealers are holding heavy melting steel for \$17.50 to \$18 and local mills are willing to pay only about \$17. Dealers expect higher prices and are offering for heavy melting steel as much as or more than the mills are willing to pay at present. Machine cast scrap has become somewhat scarce. Dealers' prices per gross ton, f.o.b. Cleveland, are as follows:

Old steel rails.....	\$17.50 to \$18.00
Old iron rails.....	20.50 to 21.00
Steel car axles.....	20.50 to 21.00
Old car wheels.....	17.50 to 18.00
Heavy melting steel.....	17.00 to 17.50
Relaying rails, 50 lb. and over.....	22.50 to 23.50
Agricultural malleable.....	15.00 to 15.50
Railroad malleable.....	16.50 to 17.00
Light bundled sheet scrap.....	11.50 to 12.00

The following prices are per net ton, f.o.b. Cleveland:

Iron car axles.....	\$21.50 to \$22.00
Cast borings.....	8.75 to 9.00
Iron and steel turnings and drillings.....	10.50 to 10.75
Steel axle turnings.....	12.00 to 12.50
No. 1 busheling.....	14.00 to 14.50
No. 1 railroad wrought.....	16.50 to 17.00
No. 1 cast.....	15.00 to 15.50
Stove plate.....	12.50 to 13.00
Bundled tin scrap.....	11.00 to 11.50

Coke.—The market is very firm, with prices about

stationary. Some furnace interests that have not covered for the first half are refusing to make contracts at present prices. Foundries are placing contracts quite freely for their first half requirements. We quote standard Connells-ville furnace coke at \$2.75 to \$3 per net ton, at oven, for spot shipment, and \$2.90 to \$3 on contract. Connells-ville 72-hour foundry coke is held at \$2.75 to \$2.90 for spot ship-ment and \$3 to \$3.40 on contract.

Cincinnati.

CINCINNATI, OHIO, October 6, 1909.—(By Telegraph.)

Active buying of finished material continues and repre-sentatives of all the leading interests devote much time to correspondence, urging faster deliveries for customers. Steel bars are firmer and structural material is in good demand from all sections save the city proper. Since the opening of the week the pig iron market has shown signs of decrease in sales and inquiries, and there has been no advance save in the Northern market, where some sellers have added 50c. to the No. 2 price. Coke is very strong. The old material dealers are buying heavily, but selling little save melting steel and relayers.

Pig Iron.—The market is relatively quiet, although the tone is strong. Most houses report a falling off in sales and a lessening of inquiries. Order books of Southern producers have not been opened for the second quarter, although a few scattering sales have gone into that period at \$15, Birming-ham, for No. 2 foundry. There is still some \$14.50 iron obtainable, but in limited quantities, and the assertion is made that it is not an open quotation. The bulk of the business for the past week or so has gone to the Northern furnaces, the most of which have sold through the entire first half and at \$16.50, at furnace. A mass of correspond-ence is passing hurrying shipments and putting up offers to furnaces, few of which seem to be vulnerable. Consumers generally are taking iron on contract quite promptly and in-creasing specifications in some cases. What resale iron there is in the market is held at market levels. Some good sales of basic have been made; a local steelmaker has taken 2000 tons, and a south central Ohio steelmaker 5000 tons. The West Virginia steelmaker wanting basic for first half is said to be still in the market. Low grades are still scarce, and prices are difficult to establish. The best obtainable is an offer of \$13.50, Birmingham, for forge and \$13 for mottled. Competition among the makers of high silicons is reported very lively. As noted, inquiries are very much lighter in volume, and the bulk of the business signed up is for small lots and for the first quarter. Standard Southern car wheel is quoted at \$22, at furnace, as minimum. There are some very heavy stocks of iron on local jobbing foundry yards, which are being rapidly reduced through the tendency of toolmakers to order castings for stock. A number of the inquiries mentioned last week are said to be still in negotia-tion and one abandoned. For prompt delivery and remain-der of the year, based on freight rates of \$3.25 from Bir-mingham and \$1.20 from Iron-ton, we quote f.o.b. Cincin-nati, as follows:

Southern coke, No. 1 foundry.....	\$18.25 to \$18.75
Southern coke, No. 2 foundry.....	17.75 to 18.25
Southern coke, No. 3 foundry.....	17.25 to 17.75
Southern coke, No. 4 foundry.....	17.00 to 17.25
Southern coke, No. 1 soft.....	18.25 to 18.75
Southern coke, No. 2 soft.....	17.75 to 18.25
Southern gray forge.....	16.75 to 17.25
Southern mottled.....	16.25 to 16.75
Ohio silvery, 8 per cent. silicon.....	20.20
Lake Superior coke, No. 1.....	18.20 to 18.70
Lake Superior coke, No. 2.....	17.70 to 18.20
Lake Superior coke, No. 3.....	17.20 to 17.70
Standard Southern car wheel.....	23.25 to 24.25
Lake Superior car wheel.....	20.25 to 21.25

(By Mail.)

Coke.—The market continues strong. In the furnace grades the spot market is especially buoyant for the reason that, coupled with the difficulties of operators to secure labor and cars, there are furnace companies with contracts far ahead compelled to buy in the spot market to supply their requirements. Spot Connells-ville furnace coke is about the same as last week—\$2.25 to \$2.50 per net ton, at oven; foundry grades are \$2.90 to \$3.25 spot, and \$3 to \$3.25 for first half. Wise County brands are quotable at \$2.10 to \$2.25 for spot furnace coke, and on contract operators are em-ploying the sliding scale basis. Pocahontas spot foundry is quotable at \$2.25 to \$2.50, and for the first half \$2.50 to \$2.75. Wise County foundry grades are quotable at \$2.50 to \$2.75 for spot, and on contract \$3. New River spot fur-nace grades are selling at \$2.25 to \$2.40, and foundry \$2.75, which is the price also for contracts.

Structural Material.—Building in the city proper is not lagging, and a number of large structures are in the pre-liminary stages, but, like those that have preceded them for the past two or three years, are largely of concrete con-struction. There is, however, plenty of business moving in structural shapes in the Central South and Southwest, and all interests report splendid business. Deliveries are from 6 to 12 weeks behind. Plates and shapes are rather uni-formly on the 1.50c., Pittsburgh, base.

Bars.—Steel bars are strong and are quoted by several interests at 1.50c., Pittsburgh, although they are still ob-tainable at 1.40c. Iron bars are in better demand and mills are making deliveries on the basis of 1.40c., Pittsburgh. Local mills with a light output are said to be making a price of 1.50c., Cincinnati, on specially attractive tonnages. On the other hand, some local mills that can give immediate delivery are asking and getting a premium of 5c. to 10c. per 100 lb.

Sheets.—The advance last week of 10c. per 100 lb. on No. 28 black and No. 28 galvanized promulgated by the leading interest has had no deterrent effect on sales, and busi-ness has been quite up to the standard of the week previous. Local mills are getting a heavy business on the same basis. Large stock orders are discouraged, and few contracts run-ning into next year are consummated.

Old Material.—Strong competition among dealers has greatly disarranged the schedule of prices on old material, and there is really no ruling price on scrap in this market, although it can be said with considerable accuracy that last week's prices are about right. The largest interests are a lit-tle apprehensive of foreign old material, and some claim that a heavy tonnage is apt to develop any time now under the new tariff ruling. Relayers are especially strong. There seems to be a scarcity of scrap offerings on the part of the railroads which are supposed to be holding back for better prices, and some selling direct. For delivery in buyers' yards, Cincinnati and southern Ohio, we quote as follows:

No. 1 R. R. wrought, net ton.....	\$14.50 to \$15.00
Cast borings, net ton.....	8.25 to 8.75
Heavy melting steel scrap, gross ton..	15.50 to 16.00
Steel turnings, net ton.....	9.25 to 9.75
No. 1 cast scrap, net ton.....	14.50 to 15.00
Burnt scrap, net ton.....	10.00 to 10.50
Old iron axles, net ton.....	19.00 to 19.50
Old iron rails, gross ton.....	18.50 to 19.00
Old steel rails, short, gross ton.....	15.50 to 16.00
Old steel rails, long, gross ton.....	16.50 to 17.00
Relaying rails, 56 lb. and up, gross ton.	22.50 to 23.00
Old car wheels, gross ton.....	15.50 to 16.00
Low phosphorus scrap, gross ton.....	18.00 to 19.00

St. Louis.

ST. LOUIS, October 4, 1909.

According to the Missouri Bureau of Statistics the sur-plus farm crops in the State realized during 1908 nearly \$35,000,000, which indicates that agriculturists were in a position not merely to supply themselves with necessities, but with luxuries as well. Postal receipts at St. Louis are climbing and reflect increased business activity, the gain for September being \$30,000, or nearly 9 per cent. on the cor-responding month of 1908.

Coke.—While there are no large inquiries for foundry coke pending, the leading sales agents report a good demand in small lots and a growing difficulty in both filling new sales and of obtaining shipment on specifications on account of prior contracts owing to car shortage and the demand centering in the producing districts, notably Connells-ville. The market seems to be gathering strength from week to week, following, as customary, the appreciation in the price of pig iron. The leading brokers are now asking for stand-ard 72-hour foundry the following prices, with the under-standing that sales of round lots are made subject to con-firmation: For prompt shipment, \$2.75; shipment prior to January 1, \$2.90 to \$3; shipment over the first half of 1910, \$3.15, per net ton, f.o.b. oven, Connells-ville.

Pig Iron.—Inquiry among the representatives of the leading furnacemen indicates that buyers would now find it difficult if not impossible to purchase round lots of standard brands of Southern No. 2 foundry for any shipment at less than \$15, Birmingham. It would appear that buyers have been quite conservative in view of the fact that in the spring of 1907 pig iron commanded \$21. It is asserted that foreign iron may hold the market from making continuous advances, but in case English makers follow the American market, as it appears likely may be the case, the parity re-mains effective. A leading house reports an inquiry for 5000 tons basic iron for shipment over the last two months of 1909 and the first or second month of 1910. Another re-ports an inquiry for 1000 tons of Southern No. 2 foundry for shipment over the first half of 1910, while a third mentions an inquiry for 500 tons of Lake Superior charcoal for ship-ment during December and January, also a sale of 500 tons of Northern foundry. All are having a satisfactory business coming from small buyers in St. Louis territory. No prices are being made for the second quarter of 1910. We quote for Southern No. 2 foundry for shipment over the balance of 1909, or for the first quarter of 1910, \$15, Birmingham.

Finished Iron and Steel.—Inquiry for structural ma-terial is fair and coming mainly from fabricators in St. Louis territory. A satisfactory demand is noted for stand-ard rails, mainly for new electric traction lines. The call for light rails is increasing. Business in bars is exceptionally good, while the call from railroads for all classes of track

supplies exceeds the ability of the leading interests to handle except on quite delayed shipment.

Lead, Spelter, Etc.—The market for lead is ruling quiet at 4.25c. asked, East St. Louis. Spelter is firm at 5.87½c. Zinc ore is fairly active, the price ranging from \$16 to \$48, the bulk of sales being made at \$47 per ton, Joplin, base. Tin is unchanged; antimony is ruling at last week's figure; copper is up 5c. per 100 lb. The demand for finished metals is of good volume.

Old Material.—Business continues good and stocks are running down. The market is strong and further advances are reported on part of the list. The demand for scrap iron and steel is now quite general and coming from both mills and foundries, mainly the latter, particularly for scrap steel. The following offerings by the railroads are posted: St. Louis & San Francisco, 2000 tons; Missouri Pacific, 2000 tons; Vandalia Line, 200 tons. We quote dealers' prices as follows, per gross ton, f.o.b. St. Louis:

Old iron rails.....	\$17.50 to \$18.00
Old steel rails, rerolling.....	16.50 to 17.00
Old steel rails, less than 3 ft.....	16.00 to 16.50
Relaying rails, standard sections, subject to inspection.....	25.00 to 25.50
Old car wheels.....	17.50 to 18.00
Heavy melting steel scrap.....	16.00 to 16.50
Frogs, switches and guards, cut apart..	16.00 to 16.50

The following quotations are per net ton:

Iron fish plates.....	\$15.50 to \$16.00
Iron car axles.....	21.00 to 21.50
No. 1 railroad wrought.....	16.00 to 16.50
No. 2 railroad wrought.....	15.00 to 15.50
Railway springs.....	14.00 to 14.50
Locomotive tires, smooth.....	15.50 to 16.00
No. 1 dealers' forge.....	11.50 to 12.00
Mixed borings.....	8.00 to 8.50
No. 1 boilers, cut to sheets and rings.....	11.50 to 12.00
No. 1 cast scrap.....	15.00 to 15.50
Stove plate and light cast scrap.....	10.75 to 11.25
Railroad malleable.....	14.00 to 14.50
Agricultural malleable.....	12.00 to 12.50
Pipes and flues.....	11.50 to 12.00
Railroad sheet and tank scrap.....	10.50 to 11.00
Railroad grate bars.....	11.50 to 12.00
Machine shop turnings.....	10.50 to 11.00

The iron molders employed in the gray iron shop of the St. Louis Car Wheel Company have struck, being refused an increase in wages. The plant has 450 men in all departments. Thus far only the gray iron shop is affected.

The stands for the new street lights are being made by the St. Louis Car Company and 200 have already been installed in season for Centennial Week.

San Francisco.

SAN FRANCISCO, September 29, 1909.

The volume of business in finished lines is so far well maintained, with a slightly increased movement in certain branches which were rather quiet at the beginning of the month. Local merchants report an increasing demand for plates, bars and merchant pipe, together with a rapid depletion of stocks on hand. The difficulty of securing new stocks as needed tends to bring about more firmness in the jobbing market, though prices are very slow to advance. A considerable increase is noted in the plate tonnage. The oil interests are increasing their storage capacity on a large scale, involving some heavy tank work, which is now a distinct feature in the market. Marine work has been fairly active all summer at the different Pacific ports, and the activity of the shipbuilders on both new and repair work has brought a better movement of boiler tubes and machinery, as well as plates. Several large machinery orders have been placed this month for new manufacturing plants of various descriptions. Buying in structural shapes continues fairly active, though the movement has not increased perceptibly within the last few weeks. Orders for fabrication, however, are fairly numerous and of more importance than for several weeks. New water supply projects are being agitated all over the coast, giving a better outlook for cast iron pipe, though the tonnage ordered this month has not been heavy.

Bars.—Bars are still in strong demand locally, particularly for concrete reinforcement, and a heavy reduction has been made in the supply on hand. Several rolling interests show increasing reluctance to take orders for early delivery to coast points, and shipment has been delayed on some of the former bookings, as a result of which local merchants find their stocks badly broken. Arrivals of foreign bars have been comparatively heavy, approaching 1000 tons in the past week, and further arrivals are expected in the near future. While this affords some relief, it is believed that there will be some difficulty in meeting the demands of the next few months. Prices, however, show little response to the advance in the Eastern market. The advance in ocean freight rates tends for the moment to check the buying for importation.

Rails.—While the large orders for transcontinental lines are placed direct with the mills, and none of the local in-

terests show much tendency to order for next year's requirements, orders booked by local mill representatives continue fairly large for both light and standard rails. Numerous projects are coming up for the extension and improvement of existing lines, and the developments spoken of for next year appear to be of a more substantial nature than some of the former projects. Construction has been authorized of a 27-mile extension of the Northwestern Pacific toward Eureka, Cal., with an immediate expenditure of \$2,000,000, and it is practically assured that the road will be continued to Eureka, 105 miles, within a few years.

Structural Material.—A fair amount of new work has been contracted during the past month, orders for fabrication having been placed for a number of buildings formerly projected. The bulk of the work now coming up is still of an unimportant nature, but the aggregate tonnage is very satisfactory, as most of the local shops are still busy on old work, and are not in a position to undertake immediately new construction of much importance. Eastern interests have taken a larger tonnage than for some time, including over 400 tons for the Children's Hospital, taken by the American Bridge Company, and a moderate lot for a new power station at the Mare Island Navy Yard by the McClintic-Marshall Construction Company. A number of fairly large contracts, however, have gone to local fabricators. The Judson Mfg. Company has taken the Oakland Y. M. C. A. contract. Contracts of some importance have been taken by local fabricators for a five-story building at Main and Market streets, and a six-story apartment building at Bush and Jones streets. The Vulcan Iron Works has a small contract for a building at Bush and Polk streets. The Berkeley Steel Company has the contract for a number of new buildings for the Benicia Iron Works, Benicia, Cal., which will require a considerable tonnage. Among the projects to come up shortly are the San Francisco Savings Union Building, and a county bridge at Merced, Cal., requiring 150 tons. A small order has just been placed for municipal work in Los Angeles. A contract for pier 54 will be let in the near future. Plans have been prepared for a 10-story apartment house in this city, and an order is soon to be placed for the Bankers' Hotel in Oakland. Two large theatre projects are under way, one at Los Angeles and one at Spokane, Wash. It is reported that the Southern Pacific will construct two new bridges in the neighborhood of Marysville, Cal., within the next two years.

Pig Iron.—While the local market on foundry iron remains comparatively inactive, the situation is becoming more satisfactory to importers, and there is more firmness as to prices than for a year. Conditions are still somewhat unsettled, and it is impossible to give quotations having any value. Importers are asking somewhat higher prices than before, the advance in foreign markets and increasing firmness in freights more than compensating for the lower tariff, but the local melters, most of whom are supplied for immediate requirements, are keeping out of the market in the expectation of a reaction. Foundry operations are still increasing, however, with additional large contracts for municipal work, and considerable activity is looked for before the end of the year. Notwithstanding the upward tendency in foreign iron, the present tariff schedule gives the importers such an advantage that no opening for any large quantity of domestic material can be looked for in this market.

Cast Iron Pipe.—Aside from continued arrivals of material for the local project, the Pacific Coast market presents no feature of immediate interest. Bookings for the past month have been comparatively small, including nothing worthy of mention for several weeks, and aside from a few small requirements for extension work in the smaller towns there is no new work in immediate prospect. Many new plans are being made, however, for the extension or installation of water systems in interior towns all over the coast, and particularly in the north, which should require a large tonnage within the next year or two. Estimates and preliminary surveys are being made for a large water system at Aberdeen, Wash. An extension of 8500 ft. of water mains is being considered at San Jose, Cal. The town of El Centro, Cal., has decided to purchase a private water system at that place and add a number of extensions.

Merchant Pipe.—More activity has been noted in the last few weeks than for the previous month, and, while no orders of unusual volume have been booked, the aggregate compares favorably with that of the summer months. The jobbing trade is still quite active and local merchants are placing mill orders somewhat more freely. Steel pipe is being used to a large extent for water works projects in the smaller towns, particularly in the vicinity of the oil fields, and numerous inquiries of fair volume are being received for such work. The oil business in southern California is again coming forward, and, while the larger orders for line pipe were placed some time ago, a good tonnage has recently been booked by independent interests for ordinary requirements. Two complete steel pipe water

systems are shortly to be installed in a new addition to Spokane, Wash.

The San Francisco Board of Public Works has awarded contracts for gate valves for the fire protection system as follows: Pittsburgh Valve, Foundry & Construction Company, \$135,372; Pelton Water Wheel Company and Union Machine Company of this city, \$203,647.

Parties in southern California have chartered a ship to transport a large quantity of rails and equipment from San Quentin, Mexico, where they were laid down several years ago by a British syndicate, which recently sold the material to the American.

The Allis-Chalmers Company will move its San Francisco headquarters about November 1 from 599 Mission street to 160 Second street.

Buffalo.

BUFFALO, N. Y., October 5, 1909.

Pig Iron.—Sales for the week have been heavy, comprised principally of foundry grades and malleable, with some basic and including a good run of prompt delivery orders for small lots up to 500 tons, with a number of 1000 and 1500 ton orders for November and December delivery. The week's sales also show a good average of larger orders for forward deliveries over the first quarter and half of next year. The tone of the market is very firm, and the outlook for higher prices in the immediate future is good. The indications are that this market, which has been going on a very conservative basis, with only a small margin of difference between Buffalo and Virginia and Birmingham prices, has an advance in store, due to the increasing demand from tributary districts, as well as to the higher cost of coke, &c. One furnace interest has already advanced its prices materially. There is an active demand for basic, and prices have advanced 50c. to 75c. per ton. The Lackawanna Steel Company has arranged to build an additional open hearth furnace with a capacity of 4000 tons per month. We quote, as follows, for deliveries this year and the first half of next, f.o.b. Buffalo:

No. 1 X foundry.....	\$17.00 to \$17.50
No. 2 X foundry.....	16.75 to 17.25
No. 2 plain.....	16.25 to 16.75
No. 3 foundry.....	16.00 to 16.50
Gray forge.....	16.00 to 16.50
Malleable.....	17.00 to 18.00
Bessemer.....	18.50 to 19.00
Basic.....	17.50 to 18.25
Charcoal.....	20.00 to 21.00

Finished Iron and Steel.—The volume of new business for the week has been large in all lines, with very heavy specifications against contracts. The sales agencies of most interests have announced that balances on contracts expiring October 1 which were not specified in full on that date would be canceled. It is understood that one or two of the independent interests have opened their books to old customers for a limited tonnage for specification over balance of this year and first quarter of next at a price of 1.45c. for steel bars and 1.55c. for shapes, Pittsburgh, an advance of \$1 per ton. Another of the independent interests announces that its price for steel bars has been advanced to 1.50c., Pittsburgh. Some of the independent interests are not yet quoting for next year's deliveries. The office of the principal interest reports continued large export business to Canada for bars and miscellaneous and structural material. The Lackawanna Steel Company is making extensive alterations to its No. 2 bar mill to afford facilities for a more miscellaneous product from that mill. The Steel Storage & Elevator Construction Company, Buffalo, has received contract for the erection of a grain elevator of 1,000,000 bushels capacity for the Spencer Kellogg Company, this city, involving 600 tons of reinforcing steel for concrete bins, and about 600 tons of structural steel for superstructure and machinery housing.

Old Material.—The market is strong in all lines, with an active demand, especially from outside districts. There has been an increased inquiry for old car wheels, which are becoming somewhat scarce. No. 1 railroad wrought is also in special demand and the price has advanced considerably. Iron axles show a noticeable advance, with a good inquiry. We quote as follows, per gross ton, f.o.b. Buffalo:

Heavy melting steel.....	\$16.50 to \$17.00
Low phosphorus steel.....	21.00 to 21.50
No. 1 railroad wrought.....	17.50 to 18.25
No. 1 railroad and machinery cast scrap..	15.50 to 16.00
Old steel axles.....	20.00 to 21.00
Old iron axles.....	25.00 to 25.50
Old car wheels.....	18.00 to 18.50
Railroad malleable.....	16.50 to 17.00
Boiler plate.....	14.50 to 15.00
Locomotive grate bars.....	12.50 to 13.00
Pipe.....	13.00 to 13.50
Wrought iron and soft steel turnings..	11.25 to 11.75
Clean cast iron borings.....	9.50 to 10.00
No. 1 busheling scrap.....	14.00 to 14.50

The American Institute of Chemical Engineers will hold its annual meeting at Philadelphia December 8 to

10. J. C. Olsen, secretary, Polytechnic Institute, Brooklyn, N. Y., states that a programme of interesting papers is being arranged, as well as excursions to a number of centers of interesting chemical industries in the vicinity.

Texas Iron Ore Developments.

AUSTIN, TEXAS, October 2, 1909.—The development on an extensive scale of the iron ore fields of eastern Texas as well as those of the more western part of the State, in the vicinity of the towns of Mason and Llano, is in a fair way to be inaugurated within the next few months.

The first authentic information of the plans that are on foot for the exploitation of the ore fields in eastern Texas reached the public through the State Railroad Commission. It was brought about by F. G. Pettibone, general manager of the Gulf Division of the Atchison, Topeka & Santa Fé Railroad, with headquarters at Galveston, appearing before the commission and asking if that body would object if his road put in a low export rate on iron ore from eastern Texas points. In explanation of his application, Mr. Pettibone stated that certain iron and steel manufacturers, whose names he declined to divulge, were ready and anxious to enter into a contract with his road for the movement of iron ore to the amount of not less than 1,000,000 tons annually from iron ore fields in Cass County to Port Bolivar and Galveston, for shipment by boat to their works in Pennsylvania. He further said that the parties to the proposed contract owned approximately 90,000,000 tons of iron ore which they would move as rapidly as possible. The commission advised Mr. Pettibone that it had no authority over export rates, but that his road could put in a low local rate on iron ore to Port Bolivar and Galveston, which rate the commission would also apply to other roads. This was satisfactory to Mr. Pettibone and the contract for the movement of the iron ore has been entered into on that basis.

The fact that Charles M. Schwab of the Bethlehem Steel Company recently visited Texas and secured control of upward of 35,000 acres of iron ore land situated near Hughes Springs, Cass County, leads to the conclusion that he is one of the parties with whom the Santa Fé has contracted to haul the ore.

It is stated by Mr. Pettibone that the Santa Fé will have to build an extension of about 50 miles from Marshall, Texas, to reach the iron ore fields. The survey for this proposed extension is now being made and the line will be completed and ready to carry the heavy traffic by January 1, according to present plans.

R. H. Downman of New Orleans, who owns extensive iron ore deposits in the Llano and Mason districts, in the middle western part of the State, is said to have received favorable reports from the engineers who have been doing exploitation work on his holdings during the last few months. The erection of a furnace at Llano is contemplated as soon as railroad connection is obtained with the coal fields, situated in Stephens County, about 100 miles north of Llano. An extension of the Frisco Railroad south from Brady will afford the desired connection. The preparations for the construction of this proposed extension are well advanced. H.

F. D. McEnteer, formerly connected with the Trussed Steel Concrete Company, Detroit, Mich., and R. F. Griffiths, connected with mining and construction operations in the Northwest for several years, have engaged in business in Pittsburgh as contracting engineers under the firm name of McEnteer & Griffiths, making a specialty of concrete work.

The Murray Iron Works Company, Burlington, Iowa, has been advised that its Murray-Corliss engine operating at the Alaska-Yukon-Pacific Exposition, Seattle, Wash., has been awarded a gold medal.

DeHart & Stafford, 114 Liberty street, New York, have been appointed agents for the metropolitan district by the American Equipment Company, Norristown, Pa., manufacturer of rivets, bolts, nuts, tie rods, &c.

New York.

NEW YORK, October 6, 1909.

Pig Iron.—The market has quieted down somewhat. There have been some further sales of foundry iron in New England, where as high as \$19.80 was realized on Virginia No. 2 foundry. There has been some buying by cast iron pipe foundries, and some important negotiations are pending. While it is reported that a number of cargoes of Middlesbrough iron have been ordered, we cannot learn of more than one now afloat for a New England founder. The pipe makers do not appear to have ordered any importations as yet. We quote New York prices as follows: Northern No. 1 foundry, \$19 to \$19.50; No. 2 foundry, \$18.50 to \$19, and No. 2 plain, \$18 to \$18.50 for delivery in 1909. Alabama irons are quoted on the basis of \$18.75 to \$19 for No. 2 foundry. They are not active in this market.

Ferroalloys.—The demand for ferromanganese continues active, and some producers are said to be sold out for this year's delivery. Sellers are quoting ferromanganese at \$44. Ferrosilicon is in good demand and in fair supply. We hear of sales at \$62.50, New York.

Steel Rails.—From the Chicago District, where the bulk of the rail business for 1910 has thus far been done, comes the report of a sale of 70,000 tons to one system in the past week for delivery next year. Of this amount 55,000 tons is open hearth and 15,000 tons Bessemer rails. The St. Paul's total order up to this time is about 100,000 tons, orders of 75,000 tons and 5000 tons having already been reported, while the remainder was added recently. The Atlantic Coast Line has placed 15,000 tons with the Tennessee Company for delivery in 1910. Its previous purchase of 10,000 tons was for this year. There are indications that a good many railroads, particularly in the West, will want deliveries in the early part of next year, and that there may be some difficulty in meeting the wishes of all of them as to shipments in the first quarter. The Idaho Southern has ordered 3300 tons of rails at Chicago. The allotment of the Pennsylvania Railroad Company's order for 1910 is as follows: Illinois Steel Company, 56,200 tons; Carnegie Steel Company, 27,100 tons; Cambria Steel Company, 41,800 tons; Pennsylvania Steel Company, 41,800 tons; Lackawanna Steel Company, 19,550 tons; Bethlehem Steel Company, 13,910 tons.

Structural Steel.—New building is quiet and to some of the fabricating companies the breathing spell is not unwelcome. The pressure for deliveries before winter continues and the congestion at the mills is interfering with plans of builders. The Interborough Railroad Company has taken bids on 3500 tons of steel for elevated construction at its shop and yards at 240th street, New York. For the Thirty-first street pier in Brooklyn, 1500 tons, Charles Meads & Co. are low bidders, but the steel has not been awarded. The Dock Department is asking bids on 800 tons of steel for a trolley viaduct on Staten Island, to bring a trolley line to the ferry terminal at Fort George. The Bethlehem Steel Company will furnish the shapes for an apartment house at Ninety-ninth street and Riverside Drive, 600 tons, for which the Hinkle Iron Works have the contract. The American Bridge Company fabricated about 50,000 tons at its shops in September and expects to increase this to 55,000 tons in October. A number of structural mills are now asking 1.60c., Pittsburgh, and we quote on plain material 1.66c. and 1.76c., tidewater, for shipments from mills.

Bars.—Profiting by the extraordinary demand for steel bars, which is much in excess of the capacity of the mills, the manufacturers of bar iron are receiving an increased volume of business, a considerable part of which is coming from those who have long been using steel bars exclusively, but for whose purposes bar iron is as serviceable. Bar iron prices are consequently firmer. Eastern mills are quoting from 1.55c. to 1.60c., tidewater, on ordinary bar iron, and 1.65c. to 1.70c. on refined and test bars. While steel bars are quoted at 1.66c. to 1.71c., tidewater, the manufacturers will take no orders for immediate shipment, and on some sizes will only take business for delivery at their convenience.

Cast Iron Pipe.—Conditions are steadily growing more encouraging. While orders are not large, they are so numerous that the aggregate quantity booked is excellent. Inquiries are coming in freely, as many consumers are anxious to close up extensions of water and gas distributing plants as quickly as possible this fall. Some inquiry is observed for next year's delivery. As far as can be ascertained, the foundries supplying this market are practically filled for the remainder of the year, and are in position to demand advanced prices for shipments next year. Carload lots of 6-in. are quoted at \$25 to \$25.50 per net ton, at tidewater.

Old Material.—Some descriptions of old material are exceedingly scarce, such as cast borings, wrought turnings, wrought iron pipe and cast scrap. Cast borings produced in New England, which at one time were freely marketed through dealers here, are now apparently being consumed by local establishments, while at the same time the demand has been increasing from steel works desiring cheap grades

of material to reduce the cost of their mixtures. Steel scrap is very strong, but sales have been light, which is probably due to the fact that most of the dealers have sold their stocks and those who now have any considerable quantity on hand are holding it for higher prices. It is claimed that it would be difficult to collect 1000 tons of steel scrap of a quality to meet steel makers' specifications in New York City and Brooklyn that would be sold at current market prices. The Swedish iron rails referred to last week were sold for importation. It is expected that other lots of the same class of material will be available. Quotations are as follows, per gross ton, New York and vicinity:

Rolling rails.....	\$16.50 to \$17.00
Old girder and T rails for melting.....	15.50 to 16.00
Heavy melting steel scrap.....	15.50 to 16.00
Relaying rails.....	22.50 to 23.00
Standard hammered iron car axles.....	24.00 to 24.50
Old steel car axles.....	20.50 to 21.00
No. 1 railroad wrought.....	18.00 to 18.50
Wrought iron track scrap.....	16.50 to 17.00
No. 1 yard wrought, long.....	16.50 to 17.00
No. 1 yard wrought, short.....	16.00 to 16.50
Light iron.....	11.00 to 11.50
Cast borings.....	10.50 to 11.00
Wrought turnings.....	12.50 to 13.00
Wrought pipe.....	14.50 to 15.00
Old car wheels.....	16.00 to 16.50
No. 1 heavy cast, broken up.....	15.00 to 15.50
Stove plate.....	13.00 to 13.50
Locomotive grate bars.....	13.00 to 13.50
Malleable cast.....	16.00 to 16.50

Metal Market.

NEW YORK, October 6, 1909.

Copper.—The copper market is dull and disappointing, and, if the market has a tone, it is an expectant one awaiting the statistics of the Copper Producers' Association. The unfavorable statistics now at hand, while they have not resulted in bringing the price down to any great extent are causing buyers to hold off. It is not thought that copper will go much lower, regardless of the inactivity on the part of consumers, as most of the large sellers declare that they would rather not sell copper at all than sell it cheaper than the prevailing market price. Even the speculative interests are quiet, and consumers who have been making inquiries show no disposition to place orders. It is the general impression that a buying movement is imminent, as some large electrical interests are said to be quite short of material. At present lake copper can be bought at 13.25c., while electrolytic can be had for 13c. In London to-day spot copper was sold for £58 and futures brought £58 17s. 6d. Sales amounted to 800 tons of spot and 2400 tons of futures.

Pig Tin.—Pressure to sell, with little disposition to buy, sums up the pig tin situation. It is certain that sales were made during the week below the cost of import, and the market has been demoralized by the speculative interests. The latter succeeded in putting up the price of pig tin and keeping it high long enough to obtain a good figure at the Banca sale in Rotterdam last Wednesday, and, as was generally expected, a decline set in immediately afterward. The price last Wednesday morning was 30.75c., but before the day was out it declined to 30.65c. Prices established during the week were as follows:

	Cents.
September 30.....	30.65
October 1.....	30.40
October 4.....	30.60
October 5.....	30.65
October 6.....	30.50

In London to-day spot tin sold for £139 5s. and futures for £140 7s. 6d. The sales amounted to 250 tons of spot and 550 tons of futures.

Tin Plate.—The advance of 10c. a box on tin plate made last week by the American Sheet & Tin Plate Company resulted in a general announcement from independent companies to the effect that they had made corresponding prices, although it has been generally understood that most of them have been demanding premiums for some weeks. The canners, who will shortly come into the market for a good supply of tin plate, have already marked up the prices for their product, and, judging from the advances they have made, they evidently think that there will be a further raise in the price of tin plate. This is also the opinion of many people in the trade, as plates are decidedly scarce at present. The price now for 100-lb. IC coke plates is \$3.74.

Lead.—There is but little buying in the lead market. Some occasional lots of resale lead have been sold under the price made by the American Smelting & Refining Company, and it would be an easy matter to obtain lead at 4.37½c., although 4.40c. is asked by the leading interests.

Spelter.—Some people are quoting as high as 6c. for spelter, but it can be obtained at 5.90c., which is an advance over the figures quoted last week. While there is but little buying, the sellers are holding the metal firm and are offering no extra inducements in order to make sales.

Antimony.—The market is very quiet. Hallett's can

be had for 8.30c. and Cookson's at 8.50c., while less known grades are offered at 7.25c.

Old Metals.—The market is steady. The following dealers' selling prices represent present conditions:

	Cents.
Copper, heavy cut and crucible.....	12.75 to 13.00
Copper, heavy and wire.....	12.25 to 12.50
Copper, light and bottoms.....	11.50 to 11.75
Brass, heavy.....	9.00 to 9.25
Brass, light.....	7.25 to 7.50
Heavy machine composition.....	11.75 to 12.00
Clean brass turnings.....	8.25 to 8.50
Composition turnings.....	9.50 to 9.75
Lead, heavy.....	4.20 to 4.25
Lead, tea.....	3.90 to 3.95
Zinc scrap.....	4.15 to 4.25

Iron and Industrial Stocks.

NEW YORK, October 6, 1909.

The feature of the week has been the practically continuous upward march of United States Steel common, which touched 94 $\frac{7}{8}$ on Monday. On Tuesday realizing sales and an advance in bank interest on money carried the price back to 90. The preferred stock on Monday reached 131, which established a new high record. Other iron and industrial stocks were firm until Tuesday, but few of them made conspicuous advances. In the Montreal stock market a sharp advance in Dominion Steel common occurred on Monday, touching 58 $\frac{1}{2}$, on reports that a Canadian steel consolidation is to be effected. The range of prices on active iron and industrial stocks from Thursday of last week to Tuesday of this week was as follows:

Allis-Chalm., com.	15 - 15 $\frac{3}{4}$	Republic, com.	45 $\frac{1}{2}$ - 48 $\frac{3}{4}$
Allis-Chalm., pref.	53 $\frac{1}{2}$ - 54 $\frac{1}{2}$	Republic, pref.	106 - 108
Beth. Steel, com.	34 $\frac{1}{2}$ - 36	South. I. & S., com.	20 - 21 $\frac{1}{2}$
Beth. Steel, pref.	68	South. I. & S., pref.	52 $\frac{1}{2}$ - 53 $\frac{1}{2}$
Can. com.	12 $\frac{1}{2}$ - 13 $\frac{3}{4}$	Sloss, com.	91 - 94 $\frac{1}{2}$
Can. pref.	82 $\frac{1}{2}$ - 85 $\frac{1}{4}$	Pipe, com.	33 $\frac{1}{2}$ - 33 $\frac{3}{4}$
Car & Fdry, com.	69 - 70 $\frac{1}{2}$	Pipe, pref.	85 $\frac{1}{2}$ - 86 $\frac{1}{4}$
Car & Fdry, pref.	118 $\frac{1}{2}$ - 119 $\frac{1}{2}$	U. S. Steel, com.	88 $\frac{1}{2}$ - 94 $\frac{7}{8}$
Steel Foundries.	61 - 61 $\frac{1}{2}$	U. S. Steel, pref.	128 $\frac{1}{2}$ - 131
Colorado Fuel.	44 $\frac{1}{2}$ - 46 $\frac{1}{2}$	Westinghouse Elec.	87 - 89
General Electric.	166 $\frac{1}{2}$ - 168 $\frac{1}{2}$	Va. Iron, Coal & C.	73 - 73 $\frac{1}{2}$
Gr. N. ore cert.	81 $\frac{1}{2}$ - 84	Chi. Pneu. Tool.	32 $\frac{1}{2}$ - 33
Int. Harv., com.	96 - 97 $\frac{1}{2}$	Am. Ship, com.	67 $\frac{1}{2}$ - 67 $\frac{3}{4}$
Int. Harv., pref.	120 $\frac{1}{2}$ - 124	Am. Ship, pref.	110 - 110 $\frac{1}{2}$
Int. Pump, com.	48 - 49 $\frac{1}{2}$	Cambria Steel.	46 $\frac{1}{2}$ - 48 $\frac{3}{4}$
Int. Pump, pref.	89 $\frac{1}{2}$ - 91	Lake Sup. Corp.	27 - 29 $\frac{1}{2}$
Locomotive, com.	60 - 61 $\frac{1}{2}$	Penn. Steel, pref.	116 $\frac{1}{2}$ - 117
Locomotive, pref.	115 $\frac{1}{2}$ - 115 $\frac{3}{4}$	Warwick.	11 $\frac{1}{2}$ - 12
Nat. En. & St. com.	21 - 21 $\frac{1}{2}$	Crucible Steel, com.	14 $\frac{1}{2}$ - 15 $\frac{1}{4}$
Pressed Steel, com.	48 - 50 $\frac{1}{2}$	Crucible Steel, pref.	82 $\frac{1}{2}$ - 84
Pressed Steel, pref.	105 - 106 $\frac{1}{2}$	Harb.-W. Ref., com.	26
Railway Spr., com.	47 $\frac{1}{2}$ - 49	Harb.-W. Ref., pref.	95
Railway Spr., pref.	106 - 109		

Last transactions up to 1.30 p.m. to-day are reported at the following prices, United States Steel common apparently suffering severely from liquidation: United States Steel common 87 $\frac{1}{4}$, preferred 127 $\frac{1}{2}$, bonds 105 $\frac{1}{2}$; Car & Foundry common 67 $\frac{1}{4}$, preferred 118 $\frac{1}{2}$; Locomotive common 58 $\frac{1}{2}$, preferred 115 $\frac{1}{2}$; Steel Foundries 61; Colorado Fuel 44 $\frac{1}{2}$; Pressed Steel common 47 $\frac{1}{4}$, preferred 105; Railway Spring common 47; Republic common 45, preferred 106; Sloss-Sheffield common 92; Cast Iron Pipe common 34 $\frac{1}{2}$, preferred 85 $\frac{1}{2}$; Can common 12 $\frac{1}{2}$, preferred 83 $\frac{3}{4}$.

Iron and Steel Bonds.

Chisholm & Chapman, 18 Wall street, New York, furnish the following quotations:

	Bld.	Asked.
Bethlehem Steel 1st ext. 5s, due January, 1926.	89	
Bethlehem Steel purchase money 6s, August, 1908.	117	
Buffalo Iron 5s, October, 1925.		
Buffalo and Susquehanna Iron 1st 5s, June, 1932.	99 $\frac{1}{2}$	
Buffalo & Susquehanna Iron deb. 5s, January, 1926.	94	
Dominion Iron & Steel 5s, July, 1929.	96 $\frac{1}{2}$	97 $\frac{1}{2}$
La Belle Iron 1st 5s, December, 1923.	104 $\frac{1}{2}$	
Lackawanna Steel 1st 5s, April, 1923.	98 $\frac{1}{2}$	98 $\frac{1}{2}$
Maryland Steel 1st 5s, February, 1922.	102	103 $\frac{1}{2}$
Pennsylvania Steel 1st 5s, November, 1917.	103	
Pennsylvania & Maryland Steel 6s, September, 1925.	110	
Republic Iron & Steel 1st 5s, October, 1934.	100 $\frac{1}{2}$	101 $\frac{1}{2}$
Sloss Iron & Steel 1st 6s, February, 1920.	107	
Sloss Iron & Steel consol. 4 $\frac{1}{2}$ s, April, 1918.	95	96 $\frac{1}{2}$
Jones & Laughlin 1st 5s, May, 1939.	102 $\frac{1}{2}$	102 $\frac{1}{2}$

United States Steel Corporation.

Collateral Trust 5s, Series A, C, E, April, 1951.	114 $\frac{1}{2}$	115 $\frac{1}{2}$
Collateral Trust 5s, Series B, D, F, April, 1951.	114 $\frac{1}{2}$	115 $\frac{1}{2}$
Sinking Fund 5s, April, 1963.	104 $\frac{1}{2}$	105 $\frac{1}{2}$
Union Steel 1st 5s, December, 1952.	105	106
Clairton Steel 5s, 1908-1913.	100	
St. Clair Furnace 1st 5s, 1910-1939.	100	
St. Clair Steel 1st 5s, 1908-1926.	100	
Illinois Steel deb. 5s, January, 1910.	100	
Illinois Steel 5s, April, 1913.	100 $\frac{1}{4}$	

All bonds quoted "and interest."

Dividends.—The Westinghouse Electric & Mfg. Company has declared a quarterly dividend of 1 $\frac{3}{4}$ per cent. and 3 $\frac{1}{2}$ per cent. on account of the 12 $\frac{1}{4}$ per cent. accumulated back dividends on the preferred stock, payable October 15.

The Vulcan Detinning Company has declared a quarterly dividend of 1 $\frac{1}{4}$ per cent. on the preferred stock, payable October 24.

The Harbison-Walker Refractories Company has declared the regular quarterly dividend of 1 $\frac{1}{2}$ per cent. on the preferred stock, payable October 20.

The Union Switch & Signal Company has declared the regular quarterly dividend of 3 per cent. on the common and preferred stocks, to be paid October 11.

Large Plans for Republic Iron & Steel Company Extensions.

Chairman John A. Topping, of the Republic Iron and Steel Company makes the following statement this week:

"The Executive Committee has authorized the use of the proceeds realized from the sale of the Republic Iron & Steel Company's preferred stock for additional and new construction, which will largely increase the productive capacity of the company in steel and pig iron, as well as diversify the finished output.

"The improvements determined upon consist of one additional blast furnace, open hearth steel works, a blooming mill and continuous mill. These improvements will be made at Haselton, Ohio, near Youngstown, at a point on the Mahoning River immediately opposite the Haselton blast furnaces and adjoining the new steel tube works now under construction by the Republic Iron & Steel Company.

"It is estimated that upon the completion of the improvements the steel ingot capacity of the company will be increased about 40 per cent. This will give a total production of ingots of approximately, 1,000,000 tons per annum and of pig iron, North and South, of approximately 1,250,000 tons."

The additional issue of preferred stock, from the proceeds of which the above improvements are to be paid for, amounted to \$4,583,100, and the last of the three installments in which the money was paid was due October 1. In addition to this amount it will be recalled that \$2,000,000 was raised some months ago by notes for the tube works construction now being carried on by the Republic company at Haselton through the Haselton Steel Tube Company. It is probable that the latest programme of construction just announced by Chairman Topping will be completed by the latter part of 1910. The new blast furnace, which will be built alongside the existing three stacks at Haselton, will be of about 450 tons capacity a day. On the opposite side of the Mahoning River, on which the Republic company has a frontage of about 1 $\frac{1}{4}$ miles on both sides, the new steel plant, blooming mill and continuous mill will be erected, the site of these abutting on that of the new tube works. The layout of the open hearth plant is for 12 60-ton furnaces ultimately. The plans now made call for the erection of six of these and possibly eight. The production of open hearth steel will permit the company to diversify its product. In addition to open hearth steel bars, it will manufacture plates and ultimately other products. A bridge will be built over the Mahoning River for the transfer of hot metal from the blast furnaces to the open hearth department.

The Amalgamated Association of Iron, Steel and Tin Workers is commencing a campaign for the organization of the blast furnace workers, tube mill employees, steel workers and other unorganized mill workmen. Meetings are to be called in Youngstown, Ohio, and a strong effort will be made to build up locals from men now nonunion. B. F. Jones, vice-president, and Thomas Williams and Walter Larkins, organizers, are in Youngstown going over the preliminary arrangements. The purpose of unionizing these men is to bring them together under the Amalgamated Association. Circulars outlining the new move are being distributed by President P. J. McArdle of the Amalgamated Association, Pittsburgh.

The Carnegie Steel Company has secured a contract for 1700 tons of United States sheet steel piling to be used in the reconstruction of the La Salle street tunnel, Chicago. An order for 1,200 tons of Friestedt piling for the St. Louis municipal water works system was also recently awarded to the same company.

The Worth Brothers Company, Coatesville, Pa., has broken ground for its second blast furnace, to be located at that place. It will be of the most modern type.

The Machinery Trade.

NEW YORK, October 6, 1909.

The demand for machinery is now quite strong and more nearly approaches the normal of a good year. Significant of the betterment that has taken place in the past month or two are the few complaints heard in the trade of unsatisfactory conditions and the general belief that much more activity is at hand. Not only do the railroads intimate that they will shortly come into the market for considerable new machine tool equipment, but more industrial enterprises are preparing good sized lists of tools on which they will ask bids at an early date. While these are being followed closely by merchants, they are not receiving as much attention as they would have been given some months ago because of the active demand for smaller lots on which a greater profit can be made. Particularly is this the case with the railroads, who, if they delay much longer in issuing their lists, will likely find it difficult to get satisfactory prices and deliveries. It is known that some houses who were asked to bid on the list of the Intercolonial Railway of Canada refused because they could make more money supplying the demand from the smaller buyers. The past week developed a great deal of new business. No large inquiries were reported, but there were a number for sizable lots received and many orders amounting to from \$10,000 to \$25,000 were closed.

The fall meeting of the National Machine Tool Builders' Association, which will take place at the Hotel Astor October 12 and 13, promises to be one of the most interesting sessions ever held by that organization. The features of the meeting will be addresses on a number of timely topics. At the morning session October 12, after the officers' reports and addresses have been given, William Lodge of the Lodge & Shipley Machine Tool Company, Cincinnati, Ohio, will read a paper on the "Creation of Machinists," and E. P. Bullard, Jr., of the Bullard Machine Tool Company, Bridgeport, Conn., will discuss the same subject. An important report will be presented by the Committee on Standardizing Electric Motors as Applied to Machine Tools, of which Paul E. Montanus is chairman. At Wednesday's session Fred A. Geier of the Cincinnati Milling Machine Company, Cincinnati, Ohio, and M. A. Coolidge of the Fitchburg Machine Company, Fitchburg, Mass., will discuss "Industrial Education as a Source of Supply Increasing the Efficiency of Machinists." Dr. M. H. Tolman of the Museum of Safety and Sanitation will deliver a stereopticon lecture Wednesday afternoon on the work of the organization he represents, and J. P. H. Perry of the Turner Construction Company, New York, will also give an illustrated talk, his subject being "Reinforced Concrete Construction from the Machine Tool Industry Standpoint."

The Palmer & Singer Mfg. Company, New York, has issued the following list of tools, which will be installed in its new plant at Astoria, L. I.: One 20 in. by 8 ft. lathe with taper, geared head; 16 in. by 8 ft. lathe with taper, geared head; 16 in. by 6 ft. lathe, universal milling machine, plain milling machine, 24-in. drill press, sliding head; sensitive drill, two water tool grinders, universal cutter grinder, medium keyseating machine, power hack saw. Quotations are desired on three different sizes of universal milling machines and plain milling machines. Orders for some of these machines were placed the past week, and it is likely that within the next week or two the entire list will be covered. The building which the company is erecting at Astoria, L. I., will be three stories, 115 x 181 ft., and will be used principally for assembling purposes.

Cyrus Currier & Sons, Market street and Railroad avenue, Newark, N. J., are letting machinery contracts for equipment for a new building to be added to its present plant. The structure is to be five stories, 37 x 76 ft. It will cost in the neighborhood of \$25,000, and part of it will be utilized by the company in the manufacture of its line of special machinery, &c., while the rest will be rented to other manufacturers.

The Harlan & Hollingsworth Corporation, Wilmington, Del., which recently erected two substantial additions to its plant, intends to erect another shop to cost about \$70,000. The new shop is to be a steel frame concrete building, 180 x 300 ft., to be used as an erecting shop for passenger cars. It will be equipped with considerable new machinery, including numerous labor saving devices.

The Maryland Steel Company, Sparrows Point, Md., is buying considerable in the way of general machinery for an addition to its shipbuilding plant and some machinery houses in this territory have been given some good sized orders. It is understood in the trade that the large improvements to be made to the plant of the Bethlehem Steel Company at South Bethlehem, Pa., will necessitate the purchase of considerable machine tool equipment. The company has decided to build two modern blast furnaces in addition to the

one now under construction, a new steel works to consist of 10 50-ton open hearth furnaces or two 20-ton Bessemer converters, and a new structural mill, a duplicate of the present one. Bids have been asked on a 28-in. universal mill, 22-in. bar mill and a 22-in. structural mill, together with roll tables, conveyor, heating furnaces, &c. These improvements and the blast furnace work now in progress will represent an outlay of \$6,000,000 and will double the capacity of the works in rails and structural shapes.

F. L. Smith & Co., 50 Church street, New York, are buying a large amount of machinery for cement making. This company is an engineering organization which makes a specialty of designing cement plants and is consulting engineer for some large cement interests. The company has spent considerable in the trade of late and is still buying a general line of equipment for cement manufactories.

The American Smelting & Refining Company is buying machinery for some rather extensive additions which are being made to its plant at Perth Amboy, N. J. The company is also adding machinery equipment to several of its other plants, and the trade here has been getting a good amount of business from that source for the last few weeks.

The Board of Education of the city of Newark, N. J., will shortly let contract for a \$650,000 building to be used as a commercial and manual training school and to be erected on High street, adjoining the present Newark Technical School. When this contract is let a large machinery list will be put before the trade which will consist of requirements for a machine shop, molding room, pattermaking shop, sheet and art metal shop, and shops for wood finishing and wood joinery. An appropriation for the building has been made and it will not be long before the machinery list is completed and put before the trade.

The General Chemical Company, which has plans for a large plant to be erected at Newell, Pa., is now buying for an addition to its Hudson River plant at Shadyside, N. Y. Its list of machinery to be installed in the Newell plant is not yet out, it is understood, and when it comes before the trade it will result in a lot of business to machinery houses in this territory, as most of the buying is done at its New York office. The plant at Newell will consist of six or eight buildings of considerable size, and beyond the fact that power will be furnished by gas engines operated by natural gas, the machinery requirements are not yet known.

The General Electric Company is asking bids on additional machines for its plant at Schenectady, N. Y. This company has been buying piecemeal for the past six months or more, and its purchases in that period aggregate a large amount of money. Almost every week the company has been sending out inquiries for a few machines, and apparently it will buy a good many more tools before its requirements shall have been covered.

Machinery houses are keeping in close touch with the Pennsylvania Railroad, which is expected to come into the market for quite a little equipment at an early date. The road now has inquiries out for a few machines.

Some time ago we mentioned the machine tool list being prepared by the Chesapeake & Ohio Railroad, which will probably be issued at an early date. The machines on which bids will be asked are to be installed in the shops at Huntington, W. Va.

The Baldwin Locomotive Works, Philadelphia, Pa., which is to buy considerable machine tool equipment for its plants at Philadelphia and Eddystone, Pa., has inquiries in the market for a few tools, and it is understood that the company will require a good many more machines than those on which it is now getting bids.

The Hilles & Jones Company, Wilmington, Del., has inquiries in the market for several machine tools.

The Standard Sanitary Mfg. Company, Pittsburgh, Pa., will build a Canadian branch manufacturing plant in Toronto at a cost of \$500,000, and an additional \$500,000 will be expended for equipment and for securing electric power from Niagara Falls. The plant will be fully equipped with electric motors and modern machinery. An emergency steam power plant will also be provided.

Purchases of machinery are being made by the Auto Press Company, College Point, Long Island, for the new addition it is building, but thus far only a part of the required equipment has been contracted for. Rapid progress is being made in the construction of the plant, with the intention, if possible, of having it in operation by the first of the year, and it is thought that the company will purchase considerably more machinery at an early date. The demand for presses which it manufactures has increased very largely, and it has become necessary to have a much greater capacity to fill orders.

The Nelson Valve Company, Philadelphia, Pa., has purchased the machine tools covered by the inquiries sent out some time ago. These tools are required for the new plant it has in course of construction, and which, when completed, will consist of 10 buildings of reinforced concrete construction, including a brass foundry, 48 x 260 ft.; brass machine shop, 48 x 256 ft.; iron machine shop, 48 x 176 ft.; storage and office building, assembling room, pattern shop, 48 x 48 ft.; pattern storage vault, addition to iron foundry, 50

x 64 ft.; chemical and testing laboratory, 32 x 35 ft., and boiler house. It is likely that when the company moves its present equipment into the new plant it will come into the market for additional machinery.

Manning, Maxwell & Moore, New York, have filed plans with the superintendent of buildings of Jersey City for the erection of two fireproof warehouses at Communipaw avenue and the Morris Canal. The buildings are to cost \$90,000, and one of them will be 50 ft. wide, 200 ft. long and 38 ft. high. The other will be 50 ft. wide, 200 ft. long and 32 ft. high. It is understood that the contract has been let for the erection of the buildings, and work will be commenced on it as soon as possible.

The New York office of the Chicago Pneumatic Tool Company reports quite an improvement in the demand for its products, recent sales including a 1055 cu. ft. steam driven air compressor for South America.

C. E. Carpenter, former sales manager of Schuchardt & Schutte, and W. L. Kerlin, who was also in the sales department of that company, have organized the Carpenter-Kerlin Gear & Machine Company, with offices and plant at 77 White street, New York. The company will sell the Schuchardt & Schutte line of gear hobbing machine, and will also cut gears for the trade.

Construction of electric traction lines is proposed by the Castle Valley Railroad, Evanston, Wyo.; Dunkard Valley Railroad, Wheeling, W. Va.; Port Jervis Traction Company, Port Jervis, N. Y.; Electric Short Line, Minneapolis, Minn.; Cincinnati, Dayton & Fort Wayne Traction Company, Cincinnati, Ohio; Fort Worth, Mineral Wells & Western Railroad, Fort Worth, Texas; Adel City Railway Company, Adel, Iowa; El Paso & Fort Hancock Railroad, El Paso, Texas; Fairburn & Atlanta Railroad & Electric Company, Fairburn, Ga.

New or extended water works systems are projected for Thompsonville, Mich.; Bloomington, Ill.; Wenoka, Okla.; League City, Texas; New Britain, Conn.; Fort Logan, Colo.; Toronto, Kan.; Beeville, Texas; Jefferson, Ohio; Shirley, Ind.; Joliet, Ill.; Yukon, Okla.; Iron, W. Va.; Bettendorf (Davenport), Iowa; Texarkana, Texas; Aberdeen, Wash. (gravity); Paragould, Ark.; Lucas, Kan.; Bottineau, N. D.; Russell, Kan.; Armstrong, B. C.; Stitzler, Okla.; Bradford, Ohio; San Pedro, Cal. (high pressure fire service); Johnson City, Tenn. (gravity); Herrick, S. D.; McDonough, N. Y. (gravity).

New England Machinery Market.

BOSTON, MASS., October 5, 1909.

Business with the local machinery dealers preserves an even tone, with a slight, but constant, improvement. There is a fair volume of orders, but nothing like the thriving condition reported from centers farther west which are closer in touch with the great automobile builders. New England reflects this wonderful demand through its machine tool manufacturers, whose new business comes in large part from their agents in the Middle States. Out there dealers and manufacturers alike are quoted as asserting that they deserve no credit for their present success, for orders in abundance come to them without the asking. The cry is for early deliveries, and with some types and sizes it is no longer possible to grant this. In fact, the hunger for machinery with some buyers is so great as to lead them to go abroad for certain tools, which they cannot get for quick shipment in this country. A considerable number of standard machines have already been ordered from Europe, in addition to special equipment which is not manufactured here.

The automobile trade is still the all-important factor in the market. General buying has not yet resumed to anywhere near the volume of three years ago, though it is constantly improving. The feeling is growing in the trade that the automobile factories are running a pace in enlarging capacity which cannot endure; that they are approaching their own market's limit of buying. If such is the case, their future wants will be more closely restricted to replacing machinery with a view to reducing production costs, which, by-the-by, has played no unimportant part in recent purchases. The machinery trade is borrowing little trouble over this threatened condition, for the belief is strong that general buying from other classes of customers will have arrived long before the needs of the automobile people in following out present plans have been satisfied.

The tendency toward higher prices of machine tools is becoming more pronounced. Milling machines are advancing, some builders having already notified the trade to that effect. Other individual manufacturers have done likewise. It is now reported that a general increase of engine lathe prices will be effected within a few weeks, and experience has shown that other classes of standard machines are quick to follow the lead of the lathe builders. It looks as if the entire list would be 10 per cent. or thereabouts above the

figures which prevailed when the slump came. The argument of the manufacturers is that advances will be absolutely necessary if they are to reap the profits of the last good times, which were none too high, if normal average earnings through a period of years are to be maintained.

The Boston & Maine Railroad has completed plans for the improvements to its repair shop facilities, which will be built immediately, and parts of which are already under way in the way of the construction of new buildings. A new car repair shop will be built at Mystic Wharf, Boston, to be 44 x 200 ft. The planing mill at the same location will be given an addition, 40 x 100 ft., and a new blacksmith shop will be 25 x 60 ft. At East Fitchburg, Mass., the car repair shop will be largely increased by an addition, 110 x 480 ft. The first unit of the great plant which ultimately will be established at Somerville, Mass., will be 170 x 200 ft. It will be known as the motive power shop for running repairs. Shippers will be benefitted by a new shed at Mystic Wharf, which will be 200 x 880 ft., two stories.

It is announced that the Williams Typewriter Company, Derby, Conn., will be reorganized and the business continued. The company is now in the hands of a receiver. It is stated that the creditors will be paid in full.

The Worcester Electric Light Company, Worcester, Mass., is said to be considering sites with the purpose of establishing a new steam generating plant, in pursuance of the announced policy of developing the business through cheaper power for manufacturing purposes. The other alternative is to purchase power from the Connecticut River Power Company, which will enter the city to supply a large unit to the American Steel & Wire Company.

The week's announcements of enlargements of general manufacturing plants includes the following: Bigelow Carpet Company, Lowell, Mass., two-story dye house, 46 x 277 ft.; five-story building, 46 x 124 ft., for laboratory, dye, paint and belt shop and storage, and three-story dye house, 46 x 285 ft.; J. B. Martin Company, Norwich, Conn., velvets, one-story weave shed, 60 x 150 ft., and two-story building, 36 x 300 ft., for offices, storeroom and shipping; United Dress Goods Company, Olneyville, R. I., new textile mill, to be equipped with 4000 spindles.

The Bryant Chucking Grinder Company, Springfield, Vt., is preparing to put on the market the new chucking grinder, of which it will make a specialty.

The Fellows Gear Shaper Company, Springfield, Vt., is erecting an addition to its shops.

The Sachs Company, Hartford, Conn., manufacturer of electric specialties, including fuses and electrical protective devices, will erect a factory building on Pliny street. It will be of heavy mill construction, 48 x 153 ft., two stories and basement. The company is not ready to state what new equipment will be required.

The Waterbury Machine Company, Waterbury, Conn., will erect a factory building, 35 x 80 ft., four stories, of mill construction. It will be located between Meadow street and Cottage place, and will be used as an extension of the machine shop, giving increased space for the building of wire mill machinery and special automatic machinery. The company also builds presses and dies, gang slitters and tumbling barrels.

Connecticut industrial stocks have been gradually strengthening during the last six months and have reached a higher level of prices. During September the securities of several important corporations have advanced. The stock of the American Brass Company, Waterbury, has risen from 114 to 115; American Hardware Corporation, New Britain, from 132 to 136; Landers, Frary & Clark, New Britain, from 75 to 77, par value \$25; Stanley Rule & Level Company from \$250 to \$275; Stanley Works, New Britain, from 52½ to 55, par value \$25; Union Mfg. Company, New Britain, from 44 to 45, par value \$25. Other Connecticut stocks have remained stationary during the month, but most of them had advanced previously.

The stock of the Northampton Emery Wheel Company, Leeds, Mass., manufacturer of grinding machines and abrasive wheels, with the exception of that held by Harry P. Otis, has been acquired by Joseph E. Paden, the Western agent of the company, and his brother, Willard S. Paden, both of Chicago. At the annual meeting, held recently, Joseph E. Paden was elected president; Willard S. Paden, general manager, and Harry P. Otis, secretary and treasurer. Ira Dimock, Hartford, Conn., one of the largest stockholders, has been the president, and Mr. Otis the general manager. The latter will continue in charge of the business for the present at least.

The new factory of George E. Belcher, Stoughton, Mass., last manufacturer, will be 52 x 121 ft., three stories.

The Lockwood Mfg. Company, South Norwalk, Conn., manufacturer of builders' hardware, will erect an addition to its plant, 30 x 58 ft., three stories.

The purchase of the tube mills at Hartford, Conn., by the Pope Mfg. Company has been completed, the deeds having been passed by the former owner, the Shelby Steel Tube Company, Pittsburgh, Pa. The Pope Company will occupy it for the overflow from the present plant, and will later

equip it for the housing of certain departments. The works were built 12 years ago by the late Albert A. Pope, for the manufacture of steel bicycle tubes. The buildings have been idle for a long time. It is stated that the purchase price was \$75,000, though the buildings cost originally \$250,000.

The Committee on Equipment of the trustees of the new industrial school, Worcester, Mass., consists of John R. Back, recently superintendent of the F. E. Reed Company; Milton P. Higgins of the Norton Company, Norton Grinding Company and Worcester Pressed Steel Company, and John P. Casey.

The Barnett Drop Forging Company, Easthampton, Mass., states that it has purchased the machinery for present needs, which will be installed in the new buildings mentioned in this column last week.

The New Britain Machine Company, New Britain, Conn., has acquired the rights to the Johnson system knife rolling machine, which rolls from 3000 to 4000 knives in nine hours. The company is doing the engineering work for over 3000 ft. of monorail for the Waterbury Lumber & Coal Company, Waterbury, Conn.

Philadelphia Machinery Market.

PHILADELPHIA, PA., October 5, 1909.

Reports so far received show that merchants do not seem to have booked as large a volume of business in the past month as they did in August, while makers dependent on this immediate locality have also transacted a trifle less. Tool builders who include the whole country as their field have taken on a somewhat larger volume. Tool buying in this immediate vicinity has not improved as rapidly as the trade would like; purchases are being conservatively made, and there has been little doing in the way of new plant equipment, and such as there has been was of an unimportant nature covering the purchase of a very small quantity of tools. On some classes of tools deliveries are a trifle harder, but those of the usual standard types can be had fairly prompt. Delayed deliveries have interfered considerably with sales of milling machines, some makers being unable to deliver some sizes and styles of tools for at least six months, and on some tools deliveries are even more extended. Prices of milling machines were advanced approximately 5 to 7½ per cent. during the week, making the third advance in the past few months. Deliveries on shapers are more delayed than they have been, but prices show no change. Quotations on the whole are very firm, and little, if any, cutting is reported.

Machine tool builders are steadily becoming better employed, additional forces are being put in many plants, and the outlook for the future is considered quite favorable.

There has been little change in the foreign demand; some business in special equipment has been done, but the standard lines of machine tools continue to drag. In some classes of power transmission equipment better conditions are reported, in others the demand is still rather irregular.

A fair business in second-hand machine tools continues to be transacted, but the market is inclined to be irregular. Sales show a demand for a wide range of tools and equipment. The second-hand engine and boiler trade has not been active, particularly in the case of engines. The demand for new engines and boilers has improved, although orders close somewhat slowly.

A better tonnage of both steel and gray iron castings continues to come out. The demand for brass castings, however, is reported as rather unsatisfactory. Steel casting plants are considerably better engaged, but prices are not as strong as the majority of the founders would like. Gray iron foundries are melting more and note a better demand for machinery castings. On the whole, the foundry trade is improving steadily, but is not yet operating on a full capacity basis.

The American Die & Tool Company, Reading, Pa., states that it has received quite an increased amount of orders for machine tools and special machinery, and business has a much brighter appearance than for several months.

At Takoma Park, Maryland, a bond issue of \$10,000 has been authorized to install a filtration plant having a daily capacity of 150,000 gal., install water meters and make alterations to a dam over Seigo Creek.

A company is to be formed to erect an electric light and power station and general system to be operated by water power at Thurmont, Md. John R. Rouzer, P. M. Hammaker, J. W. Creagar and M. A. Birely are reported to be interested.

Ballinger & Perrot, Philadelphia, architects and engineers, are taking estimates for a one-story addition, 70 x 134 ft., to the factory of C. H. Masland & Sons, manufacturers of textile goods, at Collins and Westmoreland streets.

The American Pulley Company, Philadelphia, reports

business as picking up rather slowly. The demand for wrought steel pulleys has been quite fair, although buyers are not inclined to carry heavy stocks, so that while orders are numerous, they are limited in individual size. The demand, however, is fully 50 per cent. better than at this time last year. The export trade continues on about an even basis, but an improvement is anticipated; foreign orders are still somewhat limited in size.

The Espen-Lucas Machine Works, Philadelphia, notes a good volume of business in all its lines of tools. The month of September was the best, in point of orders taken, that this concern ever experienced, and all departments of the plant are now being operated at full capacity. The demand in this particular territory, however, has been light, the bulk of the business coming from other sections. Inquiries continue quite good, particularly for cold saw cutting-off machines and special milling machines.

The E. H. Mumford Company, manufacturer of foundry molding machines, Philadelphia, reports a very satisfactory demand for special machines for various classes of work. In the general line of molding machines those of the jolt ramming type are the most active. Sales have been numerous.

The Tropenas Steel Company, New Castle, Pa., reports some improvement in the demand for steel castings, particularly in the manganese steel department, although a better movement is to be noted in Tropenas steel foundry equipment. At present this company has ready for shipment a complete two-ton remodeled Tropenas converter plant to be erected at the Cavite Navy Yard, P. I.; one Tropenas baby converter equipment to be erected for the Michigan Crucible Steel Casting Company, Detroit, Mich., and another, of the same type, to be erected for the De Soto Foundry & Machine Company, Mansfield, La. Inquiries for converter equipment are numerous, both for small and large capacities. This concern is now making up Tropenas converters to be carried in stock, and expects, within the next two months, to be able to ship a complete plant within two days after the receipt of an order.

Chicago Machinery Market.

CHICAGO, ILL., October 5, 1909.

Reflecting quickened trade movements which are steadily filling up plant capacities in nearly all iron and steel working plants, the demand for machinery in the Middle West is very heavy. Several of the leading machine tool houses agree in the statement that business is coming in at a rate considerably in excess of anything heretofore experienced in former banner years. Stock is being shipped from warehouse floors faster than it is being replaced by factory shipments. As long as trade was almost wholly dependent upon the automobile industry, as was the case up until within a comparatively short time, there was some doubt felt as to its indefinite continuance. But now that the buying has become more general, great faith is expressed in the stability of forces upholding the market. Within the past week orders from the small job shops of various kinds consisting of single tools such as a lathe, drill press or shaper have been particularly numerous. The inference is that small shops are beginning to receive overflow orders from overcrowded departments in manufacturing plants. This bespeaks a state of activity that promises even greater future requirements. About the only obstacle now in the way of a maintenance of the present satisfactory movement, or even its acceleration, is the possible extension of deliveries on some tools. Thus far it is only in a few lines, such as millers, screw machines and grinders, that conditions in this respect are especially unsatisfactory; but like tendencies are beginning to be observed in other lines. An extreme case, though not typical of the situation, is noted in the entry of an order last week for two millers for delivery in September, 1910. As an indication of what is doing in this market, it may be stated that daily sales of some of the leading machine tool houses are not infrequently running as high as \$10,000 a day. And what is even more significant, such results are not wholly dependent upon the receipt of notably large orders, but are made up in large part of numerous small orders. There are, however, an increasing number of inquiries for new shop equipments of moderate size. Conspicuous among these are new plants being established for the manufacture of gasoline engines and hardware specialties. Included in last week's transactions was the sale by a local dealer of \$15,000 worth of tools which will comprise part of the equipment to be installed in the Buffalo plant of the Otis Elevator Company. One of the last industries to feel the effects of improved conditions was the boiler shops; but they are now decidedly more active.

Figures have been asked by the Allis-Chalmers Company, Milwaukee, Wis., on several machine tools, the cost of which will aggregate about \$15,000, but it is understood that no orders have as yet resulted from this inquiry.

The Eureka Machine Company, Lansing, Mich., maker of high grade concrete mixers, is about to let a contract for the erection of a new factory building, 50 x 150 ft., which will occupy a site at Case and Handy streets, and which is to be completed by January 1. The building will be of brick construction and proportioned to sustain an additional story, which will be added when the needs of the business demand it. It is stated that while no new machinery will be purchased at this time, it is expected that several new tools, such as lathes and milling machines, will be added next year.

The Metzger Motor Car Company, Detroit, Mich., recently organized with a capital stock of \$500,000, of which \$300,000 is paid in, has purchased the trunk manufacturing plant of Jacob Meier, located at Milwaukee avenue and the Grand Trunk Railroad. This plant occupies 2½ acres of ground, and is well adapted to the manufacture of automobiles. Considerable new machinery has already been purchased, and is now being installed, with a view to turning out cars within 90 days. It is expected that during the year of 1910 5000 automobiles will be manufactured by this concern. Plans for further extension are also being made, and additional buildings have been decided upon. The officers of the company are B. F. Everett, president, and William E. Metzger, secretary and treasurer, both of whom were connected with the Everett-Metzer-Flanders Company, which was taken over last May by the Studebaker Mfg. Company and William Kelly, vice-president.

The Burlington Brass Works, Burlington, Wis., maker of high-grade plumbers' brass goods, is preparing plans for a new addition to its plant, which will consist of a one-story brick building, 75 x 150 ft., of saw tooth construction. This improvement is the result of expanding trade requirements calling for enlarged facilities and will be completed about the first of the year. The shop will be practically fireproof, having cement floors, and included in the equipment required will be a fan system of heating, electric lights and sprinkling system.

The plant recently vacated by the Stover Motor Car Company, Freeport, Ill., has been occupied by the Stover Engine Works, which is also enlarging its present plant by the erection of new buildings that will double the capacity of its testing floor. The company is now engaged upon the execution of a large shipment of marine engines for export to South America, and is compelled to run day and night shifts to take care of accumulated orders.

John Knappe Machine Company, Grand Rapids, Mich., manufacturer of show case fixtures, special machinery and metal press work, has purchased the automobile plant of the Harrison Wagon Works, into which it is moving the equipment and stock from its present plant. This removal will result in the acquisition of 24,000 sq. ft. of floor space, which is double that formerly occupied by the company. Facilities for increasing its output will be increased by the installation of new machinery. The same company has also acquired the Michigan Plating Company, which it will succeed in business, and has taken over the Berkeley Spring Seat Post Company, the business of which will be continued under its present name. The officers of the consolidated companies are John Knappe, president, and E. J. Vogt, secretary and treasurer.

Sealed proposals will be received by the city of Helena, Mont., until October 18, for the following electrical equipment: Two dynamos, each 100 k. v. a., three phase, 60 cycle, 2300 volts, direct connected; two producer gas engines, 150 hp. each; two 150-hp. anthracite producer gas generators; one 3-hp. gasoline engine for driving blower, air compressor and coal elevator; two switchboards and feeder panels; all complete as per specifications on file in the office of the City Clerk, J. A. Mattson, to whom all proposals should be addressed, and marked electric light plant proposals.

The St. Louis Refrigerating & Cold Storage Company, St. Louis, Mo., will purchase the following machinery for the equipment of its new seven-story cold storage plant: One 130-ton compression machine; a gas or oil engine; possibly gas producer; brine pumps; centrifugal water pumps having capacity of 2500 gal. per min. against 130 ft. head, and two two-ton elevators.

The city of Center, Mo., is preparing to build an electric light and ice plant, the latter with a capacity of 10 to 12 tons of ice per day. The sum of \$10,000 has been appropriated for these improvements, for which none of the equipment required has as yet been purchased. Inquiries should be addressed to H. S. Smith, secretary.

The Swedish Chamber of Commerce of New York, whose office is in the Produce Exchange, New York, announces in its bulletin that a Swedish firm wants connections with United States makers of annealed hoop iron; the Swedish maker of Eskilstuna cutlery wants agents in the United States; connections with United States buyers are desired by a Swedish manufacturer of annealed iron wire. The Chamber issues periodically a bulletin in which inquiries of this kind are published.

Cincinnati Machinery Market.

CINCINNATI, OHIO, October 5, 1909.

Conditions in the tool trade continue to improve with each succeeding day; inquiries are of a more definite character and more portentous of business, and within the past week or so some good sized shipments of shapers, millers, lathes and drills have gone to Europe. Lathes are still leading, and every concern manufacturing that type of tool is doing a satisfactory, a few a phenomenal business. A feature of the local situation among manufacturers is the tendency to make up machines for stock. Recalling how many were caught at the time of the 1906-1907 pressure, the leaders are gradually filling up the stock floor, although at least three of the larger establishments making this standard tool must content themselves for the present with bending all efforts to turn out tools enough to fill orders already booked and deliveries promised for large automobile plants. To a degree this condition is also true of as many concerns making milling machines. Tool manufacturers watching closely the rise in prices of iron and steel are convinced that it is but a question of a few weeks or months at best until the machinery trade will feel the full effects of this advance and the wise ones are preparing themselves accordingly. A large local manufacturing establishment in which shapers are a specialty has followed the plan of keeping 150 to 200 shapers coming through at all times regardless of trade conditions, and has on several occasions justified the business principle involved. The wisdom of the scheme was pleasantly demonstrated the early part of the year, when the demand for machines begun to be felt suddenly in all parts of the country and early deliveries were specified. Some builders were caught practically bare of stock, having let it run down during the depression.

Second-hand tools have always brought good prices in this territory and the demand has continued fair. There is an increased inquiry for used tools, such as millers, screw machines and lathes. Some purchasers have taken second-hand tools of a certain line or lines to fill gaps in their shop equipment which did not permit of waiting deliveries of new machines.

Jobbing foundries are all busy. The foundry that does not run a capacity heat daily is the exception. Some of these are booked up on business for two and three months.

Portable electric drills are growing in popularity and all local concerns manufacturing this type of tool report satisfactory business, which will increase through the steady growth and enlargement of the automobile industry. These drills are used largely in body and bed work by the motor builders.

The Hisey-Wolf Company, Cincinnati, manufacturer of portable electric tools, has been steadily increasing its manufacturing facilities by enlarging shops and installing new tools. The capacity has been doubled since January 1, 1909, and the company is now getting in better shape to deliver from stock.

The largest deal locally ever put through in the iron and steel manufacturing industry was closed last week when a syndicate headed by W. E. Hutton & Co. of New York and Cincinnati purchased from the American Rolling Mill Company its new issue of common stock, involving over \$3,000,000, all of which was secured in about five days. The American Rolling Mill Company, made up principally of Cincinnati capitalists, operates plants in Middletown and Zanesville, Ohio. The present capital consists of \$800,000 of 6 per cent. preferred and \$2,200,000 of common stock paying 12 per cent. dividends. The issue underwritten by the syndicate consists of \$1,500,000 par value new common stock, which will receive the 12 per cent. dividend. The Middletown and Zanesville plants have a capacity of 50,000 tons annually of the noncorrosive ingot iron, on which the company holds five basic patents, the demand for which has increased at a rapid rate in recent years. The new plant to be built soon, probably in Middletown, will increase the gross output of the plants to 150,000 tons annually, and is expected to cost about \$2,270,000.

The Schacht Mfg. Company, Cincinnati, Ohio, builder of a patent type of automobile, has purchased additional ground and buildings and will enlarge its quarters on Spring Grove avenue.

The problem of housing the thousands of employees of concerns making up the new Oakley factory colony, Cincinnati suburb, is engaging manufacturers whose plants are nearing completion there. A number of informal meetings have been held by the officials of the Modern Foundry Company, Triumph Electric Company, Cincinnati Planer Company, Peck-Williamson Company and others and a number of plans evolved which are expected to develop something tangible soon. The Triumph Electric Company is ready to assist its workmen in securing homes and will turn over the property to them at cost should they want to build. The plan that is expected to be the most satisfactory is the formation of a building company that will put up a number of houses for rent.

Anticipating the visit of the large body of Japanese now

touring the large commercial and manufacturing centers, arrangements will be made to escort them through as many of the tool manufacturing plants as they may care to visit. As a rule proprietors of these establishments are not fearful of the Japanese carrying away ideas that will enable them to copy successfully the American made tool, notwithstanding the common report attributing this extreme cleverness to them. The delegation is due in Cincinnati November 7. Col. Wm. B. Melish is chairman of the Reception Committee, and S. P. Egan of the J. A. Fay & Egan Company, maker of woodworking machinery, chairman of the Finance Committee.

It is reported that the plant of the Kauffman Buggy Company at Miamisburgh, Ohio, which has been operated for some time under a receivership, is to be sold and that the purchaser will remodel it into an automobile building plant. The receiver is T. J. Kauffman, auditor of Montgomery County.

The L. Kruckemeyer Company has amended its charter by the increase of its capital stock from \$26,000 to \$50,000. It manufactures furnaces and sheet metal work.

The Robbins & Meyers Company, Springfield, Ohio, is having a large foreign trade and is operating close to capacity. A large shipment for South America will be made the latter part of the month.

J. K. Dimmick & Co., Land Title Building, Philadelphia, announce the removal of their Cincinnati office from 53 Pickering Building to 906 Mercantile Library Building.

Milwaukee Machinery Market.

MILWAUKEE, WIS., October 5, 1909.

The most significant feature of the present situation is the fact that manufacturers here are looking to the West for business in a greater degree than ever before. Trade with the Pacific Coast and mountain States is particularly brisk, and among the orders received in Milwaukee recently are some of considerable size.

Another factor of great importance is the extraordinary activity manifested throughout the West and South in building, extending or improving water systems for municipalities, sanitary districts, mills, power plants and irrigation works. This, besides bringing orders for pumping machinery as well as electrical apparatus, is providing a large amount of work for foundries and machine shops which supply special castings, parts and fittings. Not until the recent long depression was much attention paid here to this class of trade, but within the past two years it has been gone after "hot-foot" and is assuming no mean volume.

Analogous to the foregoing, is comment heard through the State lately to the effect that the boiler business in Wisconsin, which is passing through a period of transition from old methods to new, will soon assume a position more in keeping with that which it formerly maintained. For many years the original type of Scotch or marine boiler was largely in demand throughout the Northwest, and this condition obtained much longer than it did farther East. Moreover, the higher freight rates formerly ruling practically excluded competition on the part of the Eastern builders of tubular boilers and numerous shops in this section did a flourishing business. Within 10 or 15 years local builders of Scotch boilers have gradually turned their attention to other lines of trade, until now only a few concerns manufacturing really high grade boilers of the non-tubular variety are left. At present, however, indications exist that more than one large company here is preparing to enter the field of tubular boiler building on a basis to compete successfully with Eastern manufacturers and some interesting developments may be looked for.

Manufacturers and dealers who specialize in construction work find that a larger proportion of metal than ever before is being used this fall in buildings. The increasing popularity of concrete does not appear to hinder this tendency but rather to encourage it, as the use of both makes structures practically fireproof.

Builders of hydraulic power machinery in this section have been interested to receive advices from the United States Geological Survey stating that the water powers thus far developed throughout the country aggregate about 5,300,000 hp. Among these there are 10 plants given as having a capacity of over 40,000 hp. each, and three of them were supplied with turbines by Wisconsin builders, while there exist only nine developments of greater size. This shows something of the proportions which the manufacture of such machinery has attained locally, particularly as Wisconsin builders' percentage of turbines, generators, &c., supplied for plants ranging from 500 to 30,000 hp. is much larger. Furthermore, it is stated that the business here has developed entirely within six years.

The Gilson Mfg. Company, Pt. Washington, Wis., has completed its new machine shop, but at the rate orders for gasoline engines are now being taken another addition to the works will be necessary in the near future.

The Bukolt Mfg. Company, Stevens Point, Wis., is proceeding with a three-story extension of its factory, 40 x 60

ft. Additional power and operating machinery will be required, together with a heating system utilizing motor driven blowers.

Erection of the new plant of the Constantine Mfg. Company, Madison, Wis., has been definitely decided upon. It will be 70 x 300 ft. and electrically operated.

A modern machine shop, equipped with the latest appliances, will be constructed at Racine, Wis., by the F. J. Greene Engineering Works.

The Gunnel Machine Company, Manitowoc, Wis., has been merged in the Manitowoc Dry Dock Company. The two companies had worked practically as a unit in the building and outfitting of both steel and wooden vessels.

The Southern Wisconsin Power Company will install transformers and other power apparatus in a new substation to be built at Portage, Wis., work on which has already begun.

Tubular boilers and an automatic or Corliss engine will be among the requirements of the American Mirror Plate Company, Milwaukee, for a new factory to be erected at Sheboygan, Wis.

The City Engineer, Milwaukee, has completed plans for a steel bridge of the bascule type at Michigan street.

The Jacob J. Vollrath Mfg. Company, Sheboygan, Wis., is proceeding with plans for the large addition to its enameled metal works which will be made next year. The machinery to be purchased has not yet been decided upon.

The plant of the United States Gypsum Company, Superior, Wis., will be reconstructed and equipped with modern machinery arranged, as far as possible, for individual motor drive.

The factory of the Hartford Plow Company, Hartford, Wis., recently destroyed by fire, will be rebuilt. As this contained the power plant supplying electric current to the entire group of Kissel shops, including the automobile works, the purchase of considerable new machinery is involved.

The Vale Automobile Company has been incorporated to operate a factory at Beloit, Wis., plans for which will be announced later.

The Escanaba Extract Company, Wells, Mich., has decided upon the purchase of six horizontal tubular boilers aggregating 900 hp., feed water heater, boiler pumps, an engine or steam turbine of 250 to 300 hp., electric generator, alternating current motors, conveyors, shafting, belting, pulleys, hangers, vacuum pans and special machinery suited to the industry. Altogether, it will make a large order.

Cleveland Machinery Market.

CLEVELAND, OHIO, October 5, 1909.

A good volume of small orders for machine tools came out the past week from various sources. September, taken as a whole, was a very satisfactory month for all of the local machinery houses, although some of them did less business in the aggregate than in July and August owing to large orders received from the automobile trade during the earlier months. Some new companies are entering the automobile field and are now buying equipment for plants soon to be established. The demand for drilling and milling machines and for automatic and plain screw machines continues heavy. Makers of automatic screw machines are crowded with orders and some are unable to promise deliveries within three to five months. A large part of the orders for automatic screw machines is coming from makers of automobile parts. The demand from railroads for machine tools for additions to repair shop equipment is steadily improving, although no large orders are coming from this source. In electrical equipment the demand for small and medium sized motors is very good and local makers are well sold up for the balance of the year. A considerable part of this business is coming from plants that are changing their machinery from belt to motor drive. The demand for second-hand tools has improved, and is expected to grow still more active as new tools for early delivery become scarcer.

Encouraging reports of improving business come from nearly all of the local manufacturers in metal working lines. Machine tool builders are so well filled with orders for the balance of the year that managers are thinking more now of filling orders as desired rather than taking on new business. While not so pronounced as a few weeks ago, there is still a scarcity of good machinists and calls for workmen that are coming from other cities cannot be filled.

A new machinery sales agency has been established in Cleveland by Don M. Osborne, who has opened an office and established a display room at 719 St. Clair avenue, Northeast. Mr. Osborn has been given the sales agency for Ohio and Michigan of the Hamilton Machine Tool Company, and in addition will handle other lines of machine tools and second-hand machinery. In addition to tools in the display room he expects to arrange soon to carry a stock for shipping purposes. Mr. Osborn is well acquainted with the Ohio machinery trade. For a number of years he was con-

nected with the machinery sales department of the Strong, Carlisle & Hammond Company, Cleveland, and for the past two and one-half years has been a member of the Osborne & Sexton Machinery Company, machinery dealer, Columbus, Ohio, from which concern he recently retired.

The Reliance Electric & Engineering Company, Cleveland, reports a heavy demand for electric motors. The company now has a large amount of work on hand and is running its plant night and day. Among the orders recently received is one for 50 Lincoln variable speed motors, from 5 to 10 hp., for individually driving the machine tool equipment for the new tube mill of the Republic Iron & Steel Company in Youngstown, Ohio; a large order from the Youngstown Sheet & Tube Company for 5 to 20 hp. motors for individual drives for new equipment in that company's tube mill; an order for 15 motors and a 75-kw. motor generating set for the General Roofing & Mfg. Company, York, Pa., and several 2 to 15 hp. motors for the York Mfg. Company, York, Pa.

At a recent meeting of the directors of the Buckeye Traction Ditcher Company, Findlay, Ohio, it was decided to build an addition to the plant, to be used as an erecting department. The present building will be used entirely for a machine shop for the manufacture of parts. The new building will be about 120 x 200 ft. With the erection of the addition it is expected that the company will be in the market for additional machine shop equipment.

The Owen Mfg. Company, Detroit, Mich., has been organized, with a capitalization of \$500,000, by Ralph Owen and others who were formerly connected with the Olds Motor Works. The company has bought a site for a plant, which it is expected will be placed in operation about January 1. The company is now placing orders for its machinery equipment.

The Warren Motor Car Company, Detroit, Mich., has been organized to place on the market a new medium priced automobile. The company will be located in a plant on Isabell street, near Michigan. The company will buy many of its parts, the manufacturing end of the concern being largely the assembling of the parts.

The Adamson Machine Company, Akron, Ohio, is buying a small amount of additional machinery equipment for its new plant, into which it will move shortly.

The Buckeye Jack Company, Louisville, Ohio, is reported to have purchased the plant formerly occupied by the Standard Bolt Mfg. Company, Alliance, Ohio, and will remove it to the latter city.

Government Purchases.

WASHINGTON, D. C., October 5, 1909.

The Isthmian Canal Commission will receive bids until October 13, Circular No. 537D, for air compressors.

Bids will be received until October 30 at the office of the United States Engineer, Boston, Mass., for motor generator sets, motors, centrifugal pumps, transformers and lightning arresters.

The following bids were opened September 27, Circular No. 536, for machinery for the Isthmian Canal Commission:

Class 10.—Eight forge blowers—Bidder 11, Fox Brothers & Co., New York, \$307.90; 25, Motley, Green & Co., New York, \$335 and \$280; 45, Vermilye & Power, New York, \$316.

Class 11.—One engine cutter for 18-in. pipe line dredge—Bidder 20, Lehner Engineering Company, New York, \$566; 25, Motley, Green & Co., New York, \$690; 46, Wetherill Machine Company, Chester, Pa., \$896.

Class 12.—One traveling crane and tracks—Bidder 5, Alfred Box & Co., Philadelphia, Pa., \$800 and \$950; 8, Case Crane Company, Columbus, Ohio, \$754; 11, Fox Brothers & Co., New York, \$509; 16, Hoisting Machinery Company, New York, \$475; 18, Knox & Brother, New York, \$715; 23, Manning, Maxwell & Moore, New York, \$606; 24, Maris Brothers, Philadelphia, Pa., \$600; 28, New Jersey Foundry & Machine Company, New York, \$545; 29, Niles-Reinent-Pond Company, New York, \$735; 45, Vermilye & Power, New York, \$639.95; 47, Whiting Foundry Equipment Company, Harvey, Ill., \$630; 50, Cleveland Crane & Engineering Company, Cleveland, Ohio, \$810.

Class 13.—Jet pumps—Bidder 11, Fox Brothers & Co., New York, \$46.14; 12, R. W. Geldart, New York, \$81; 23, Manning, Maxwell & Moore, New York, \$165; 25, Motley, Green & Co., New York, \$106.95; 26, National Electrical Supply Company, Washington, D. C., \$134.85; 37, Schutte & Koertling Company, Philadelphia, Pa., \$102.15.

The following bids were opened September 28, Circular No. 537A, for machinery for the Isthmian Canal Commission:

Item 1.—One 20-ton locomotive coaling crane—Bidder 1, American Hoist & Derrick Company, St. Paul, Minn., \$16,453.30; 4, Brown Hoisting Machinery Company, Cleveland, Ohio, \$15,420; 5, Browning Engineering Company, Cleveland, Ohio, \$13,250; 11, Industrial Works, Bay City, Mich., \$13,000; 12, Interstate Engineering Company, Bedford, Ohio, \$15,000; 17, Orton & Steimbrenner, Chicago, Ill., \$12,670.

Item 4.—Two single-phase motors—Bidder 9, General Electric Company, Schenectady, N. Y., \$138; 14, Montgomery & Co., New York, \$128; 16, National Electrical Supply Company, Washington, D. C., \$150; 20, Westinghouse Electric & Mfg. Company, Pittsburgh, Pa., \$102.

The following bids opened September 28 for machinery for the navy yards:

Class 1.—One high pressure air compressor with parts—Bidder 90, Henshaw-Bulkley & Co., San Francisco, Cal., \$5009.35; 152, Platt Iron Works Company, Dayton, Ohio, \$2870.50.

Class 2.—Three transformers—Bidder 2, Allis-Chalmers Company, Milwaukee, Wis., \$238; 60, Fort Wayne Electric Works, Fort Wayne, Ind., \$179.82; 71, General Electric Company, Schenectady, N. Y., \$235.35; 126, Malony Electric Company, St. Louis, Mo., \$235; 133, Montgomery & Co., New York, \$197; 203, Western Electric Company, New York, \$250; 209, Westinghouse Electric & Mfg. Company, Pittsburgh, Pa., \$234.65; 210, Wagner Electric Company, St. Louis, Mo., \$233.60.

Class 11.—Four turret turning equipments with spare parts—Bidder 24, Cutler-Hammer Mfg. Company, Milwaukee, Wis., \$2625; 71, General Electric Company, Schenectady, N. Y., \$1900.

Class 111.—Machinery for central power plant—Bidder 34, Crane Company, Baltimore, Md., \$601.70; 102, Kieley & Mueller, New York, \$217.50; 105, E. F. Keating Company, New York, \$1375.55; 132, Material Supply Company, Oradale, N. J., \$1328; 222, Central Metal & Supply Company, Baltimore, Md., \$1218.10.

Class 121.—Three portable burners and two portable rivet heating forges—Bidder 21, W. W. Bain, Portsmouth, Va., \$449; 68, R. W. Geldart, New York, \$435; 77, Handlan-Buck Mfg. Company, St. Louis, Mo., \$435; 81, Hauck Mfg. Company, Brooklyn, N. Y., \$545; 121, Mirco Fuel Oil Equipment Company, Norfolk, Va., \$411; 128, Manning, Maxwell & Moore, New York, \$200 and \$178.20; 143, Oil Burner Engineering Company, New York, \$395; 166, Rockwell Furnace Company, New York, \$490; 201, Vermilye & Power, New York, \$417.90; 217, Weil-Guettman Supply Company, New Orleans, La., \$464.46.

The following bids were opened September 14 for machinery for the navy yards:

Class 1.—One compressed air locomotive—Bidder 17, Baldwin Locomotive Works, Philadelphia, Pa., \$2530; 126, H. K. Porter Company, Pittsburgh, Pa., \$3025.

Class 2.—Two electrically driven air compressors—Bidder 87, Ingersoll-Rand Company, New York, \$2097 and \$2367; 100, Laidlaw-Dunn-Gordon Company, New York, \$2850; 126, H. K. Porter Company, Pittsburgh, Pa., \$2645.

Class 11.—Eight compound hydro-pneumatic ash ejectors—Bidder 46, Exeter Machine Works, Pittston, Pa., \$5000, \$4000 and \$5150; 66, Glasgow Iron & Supply Company, New York, \$1584, accepted.

Class 81.—One generator set and spare parts—Bidder 39, Diehl Mfg. Company, Elizabethport, N. J., \$900; 52, Fairbanks, Morse & Co., Chicago, Ill., \$658.40; 56, Fort Wayne Electric Company, Fort Wayne, Ind., \$540.25; 70, Garwood Electric Company, New York, \$762; 71, General Electric Company, Schenectady, N. Y., \$111.50; 149, B. F. Sturtevant Company, Hyde Park, Mass., \$601; 175, Westinghouse Electric & Mfg. Company, Pittsburgh, Pa., \$599.

Class 102.—One blind stile borer and mortiser—Bidder 4, American Wood Working Machinery Company, Rochester, N. Y., \$375; 53, J. A. Fay & Egan Company, Cincinnati, Ohio, \$225.

Class 111.—One complete set of propelling machinery for sailing launch—Bidder 157, Trenton Engine Company, Trenton, N. J., \$825, accepted.

Class 112.—One heavy duty gasoline engine—Bidder 72, Gas Engine & Power Company, Morris Heights, N. Y., \$4456; 84, Hoisting Machinery Company, New York, \$2180; 85, Holmes Motor Company, West Milford, Conn., \$3200; 103, Murray & Tregurtha Company, South Boston, Mass., \$2800; 143, Sterling Engine Company, Buffalo, N. Y., \$2400; 157, Trenton Engine Company, Trenton, N. J., \$2955.

Class 131.—One double roll sand crusher with pan—Bidder 106, Manning, Maxwell & Moore, New York, \$707; 124, S. Obermayer Company, Cincinnati, Ohio, \$1500; 166, Vermilye & Power, New York, \$745.

Class 221.—Eight drills, two portable motors and two portable bench grinders—Bidder 26, Cincinnati Electrical Tool Company, Cincinnati, Ohio, \$556; 29, Chicago Pneumatic Tool Company, Chicago, Ill., \$670; 54, Frevert Machinery Company, New York, \$758; 69, R. W. Geldart, New York, \$764; 80, Hisey-Wolf Machine Company, Cincinnati, Ohio, \$764; 88, Independent Pneumatic Tool Company, Chicago, Ill., \$725.80; 94, Knox & Brother, New York, \$764; 106, Manning, Maxwell & Moore, New York, \$764; 109, Montgomery & Co., New York, \$558.56; 113, Manhattan Supply Company, New York, \$764; 115, National Electrical Supply Company, Washington, D. C., \$549, accepted.

Welfare Work.—A pamphlet under the title "Man Efficiency" has been issued by the Industrial Department of the International Committee of the Young Men's Christian Association, 124 East Twenty-eighth street, New York. It describes by means of excellent illustrations, accompanied by letters from industrial managers, the plan under which the association promotes welfare work among industrial workers. The illustrations include views of various buildings erected by manufacturing companies for the benefit of their employees and conducted under the auspices of the Young Men's Christian Association. The manager of one large company writes: "It is an easy thing to build and equip welfare buildings, but it is a hard thing to have them profitably used." In "Man Efficiency" and two leaflets which accompany it, testimony is given as to the success of the Y. M. C. A. movement of this character and the reasons for the results obtained.

The Lakeside Forge & Wrench Company, Springfield, Mass., has acquired the plant of the Springfield Drop Forge Company, Springfield, and has begun operations with a full force of men. Eugene Childs, formerly connected with the Trimont Mfg. Company, Roxbury, Mass., will be president and general manager of the company, and his past reputation in this line of business will be a guarantee of the quality of the output and an assurance of prompt and efficient service.

HARDWARE

IT is a good sign that Hardware merchants are giving increased attention to the fancier and finer lines which are commonly designated as holiday goods. Fortunately, however, their sale is not limited to the Christmas and New Year season, but is, to a greater or lesser extent, continuous throughout the year, and the store thus has the advantage of greater attractiveness, as well as of a larger, more diversified and more profitable business. Attention to this class of goods thus has the effect of improving the appearance, enlarging the sphere of its operations and increasing the number of its patrons.

The Sale of Holiday Goods

It would be a mistake to maintain that every Hardware store should go into the fancier lines referred to. There are some stores whose general business is of such a character that holiday goods would be out of place and unprofitable. In such cases wisdom is shown in keeping along in the course which has been successfully followed, finding there sufficient field for initiative, enterprise and energy in carrying it on. But while this is true there is on the other hand no doubt that in a great many stores this department of the business is too much neglected. It is not an easy thing to break away from the traditional restrictions of the old school Hardware store. The plea is sometimes made that it is good policy to let well enough alone. There is a perplexing variety of goods outside the necessities of the blacksmith, the mechanic and the housekeeper from which choice must be made. In entering on this new field there is some danger of making a mistake and stocking articles which will not find ready sale. Most serious of all is the difficulty of getting out of the rut. For these and many other reasons many merchants are confining their business to narrower lines than their opportunities would suggest and fail to chronicle the success which they might achieve.

The Old School Hardware Store

In another column we give a list of goods to which special prominence is given by many merchants during the holiday season. It will be observed that they include many attractive articles which have a regular place in many a Hardware stock. We commend the list to the careful study of our readers. It may suggest additions which might well be made to their assortment. But if goods of this character are to have a conspicuous place in the store during the approaching holidays preparation should be made at once. Many merchants have already made their plans and purchased the goods for the Christmas and New Year's trade, and much is gained by taking this matter in hand in good time. It is, however, not too late for those who are convinced that they should take up the sale of holiday goods to move in this direction. But there is no time to be lost. There is a call for decision and prompt action.

Preparing for the Holidays

Condition of Trade.

As we approach the anniversary of the panic which broke with so much severity two years ago, there is an impressive suggestion of the very different conditions in trade and finance prevailing in the two periods. There was then by experienced observers a recognition of the probability of impending disturbance, while at the present time the greater part of the damage has been repaired and the country is looking forward to a period of safe finances and renewed commercial activity, accompanied by exceptional prosperity. The past week, and the month which has just closed, have marked a steady, if not complete, return to normal business in the general trade of the country, and in this improvement Hardware has had its due share. It has not, however, kept pace with the Iron market in which there has been such a rapid advance in prices and increase in volume of current orders. The strength of the market for the raw material has, however, affected many heavy goods, directly causing the announcement of higher prices, while a great many other goods, not lying so close to the raw material, feel the influence of the changed conditions. Apart, however, from any changes in price as the result of the higher values of Iron products there is a decidedly stimulating influence on account of the undertone of strength thus given to the market as a whole. There is also much in this condition of things to stimulate buying and a fair volume of business is reported. While some efforts are naturally made by those who have goods to sell to induce their customers to purchase liberally, there is a good deal of conservatism on the part of buyers, and in the Hardware field, regarded as a whole, the volume of business is fair, rather than heavy. In many lines manufacturers are well supplied with orders, and comparisons with last year and the year before indicate a very satisfactory improvement. In most lines of Shelf and Miscellaneous Goods there is little trouble in obtaining the prompt execution of orders, but in a few lines manufacturers have some difficulty in making shipments as promptly as their customers desire. The amount of building in progress is one of the marked features of the situation. The extent to which the railroads are purchasing for the improvement of their properties is one of the most satisfactory indications of restored confidence and renewed enterprise. Throughout the country the prevalence of good weather generally has been very favorable for the harvesting of crops, and the results of the agricultural operations of the year are such as to secure great harvests and thus add to the national wealth. The cotton crop, while it suffers in volume, commands an excellent price, and it is to be hoped that any disappointment in regard to it will not militate too severely against the prosperity of the South.

Chicago.

Viewed as a whole, the business of September was of fairly satisfactory volume, and unless expectations are wide of the mark, that of October will be still better. All influences surrounding the Hardware market are of a character well calculated, not only to sustain the present movement, but to inspire it to even greater activity. There is an enormous demand for iron and steel material entering into the manufacture of heavy goods, and much difficulty is being experienced by the mills in meet-

ing requirements of manufacturers. Then, too, it is quite evident that industrial plants of all kinds are rapidly filling up with work, which means more extended consumption of various articles of Hardware. Trade from this source, in all probability, will be supplanted by an undiminished, if not largely augmented, demand from other consumers including the agricultural interests. The outlook in every direction is, in fact, such as to encourage sentiments of optimism, which are now quite as prevalent as were those of opposite tendency during the months immediately succeeding the period of depression that followed the memorable panic of October, 1907. Values then reduced to an abnormally low level in the strife of competition engendered by a shrunk volume of business have gradually been restored to a more satisfactory level. Even where full recovery has not been experienced, price conditions are greatly improved, and firmness, at least, has in practically all lines supplanted irregularity and weakness. In line with and emphasizing the upward course of prices on heavy staples is the announcement of an advance of \$2 a ton on black, box annealed and galvanized sheets effective October 28. Jobbers' prices have been correspondingly advanced, and the prices now ruling from store are \$3.90 to \$4 for No. 28 galvanized and \$2.85 to \$2.95 for No. 28 black. It is only within the last few weeks that the demand for sheets has been particularly active, prior to which time prices were but indefinitely maintained. Recent buying, however, has so altered the situation that so far as mill shipments are concerned, the question of prices is now secondary to that of delivery. Trade in the local market is being supported by unprecedented activity in new building construction, and is generally satisfactory. Bids are being taken on about \$50,000 worth of Builders' Hardware required for the new Chicago City Hall and several other contracts of like character but of less amount will be placed in the near future.

Portland, Oregon.

FALLING-McCALMAN COMPANY.—Business continues good, with excellent prospects for continuance of the present good conditions. The writer the first of this week was up through a small portion of the territory tributary to Portland, and if conditions in all our territory are anywhere near as good as they are in the small section visited, we ought all to be prosperous for some time to come, and we believe conditions are practically the same over all our territory.

It is too early as yet to feel the full effects of the Alaska-Yukon-Pacific Exposition with regards to immigration, but the prospects are that next year, partially due to the fair and partially due to the advertising done by the commercial bodies and the railroad companies, there will be a much larger influx of people into this territory than there was this year, when our increase of population was much greater than ever before.

Taking it all together, we are very well satisfied with conditions at the present time.

St. Paul.

FARWELL, OZMUN, KIRK & Co.—There is but little of special interest to write at this time. We have entered on the last quarter of the year with conditions generally as favorable as has been expected.

The weather, which is the big factor, has been very favorable for farm work. Threshing and plowing have been pushed along and "shock" threshing is probably finished to within the last quarter. There is still considerable flax to thresh. Two more weeks of good weather will about complete it.

The yield of wheat is not quite up to expectations, but it is generally fair, and, as prices are still running, the returns will be fairly satisfactory. There have been but few heavy rains to injure outstanding grain and at the same time there has been sufficient moisture to keep up the pastures and also to prevent damaging fires.

Another marked feature of the season has been the absence of frost. It is a rare thing in northern Minnesota or North Dakota to see such flowers as sweet peas in bloom at the first of October, but they can be seen

now in abundance, as the writer personally witnessed within the last few days. There has not been a severe killing frost this season in this latitude. Corn has fully ripened and vegetation is very abundant.

The demand is not quite so large as it would be if the farmers were not so busy, but it is still good and on ahead the farmers will have funds to pay bills and to buy goods. The prospects are for a healthy, satisfactory trade. Collections have been somewhat delayed by the conditions of weather, above noted, and also by the general belief that the price of wheat is likely to go higher.

Cleveland.

W. BINGHAM COMPANY.—Revision and change in prices seems to be the order of the day. Of course, the supply and demand will regulate this to a certain extent. The manufacturers, however, are finding a great many goods have been sold without profit and cannot be produced at the old figures.

We strongly advise the purchase of rubber goods for present and future use. We believe that Rubber Lawn Hose at present prices will appreciate in value 10 to 20 per cent. before the first of the year. Everything in which rubber is a component part must advance, for rubber gum has increased in price in the last six months over 100 per cent.

Revision in many lists seems necessary, especially so in Copper and Brass Goods, as the discount from the old list did not bear the manufacturers a fair margin of profit on the goods, so in self-defense they have been obliged to advance the list on Brass Faucets, Stop and Waste Cocks, Soldering Nipples and many Plumbers' Goods. Leather Belt of different makes has advanced 10 to 15 per cent. On account of the great advance in broom corn, Sweeping and Whisk Brooms have advanced over 50 per cent. So it goes.

As a result of the growth and stability of our railroad and industrial concerns their stock is being sought for now by European investors, and financial men and manufacturers who have been visiting Europe report that prosperity is being felt over there on account of the good times we are having here. This country is the barometer of the world.

The general Hardware trade in this section is very good, and no complaints except a shortage in some goods can be made, but this is not to be wondered at when you consider the great variety of goods Cleveland jobbers handle. On Strap Hinges, Butts, Bright Wire Goods, Sash Lifts, Barrel Bolts, Steel Squares and many other similar articles manufacturers have advanced the price a little. Some jobbers are still well supplied with these goods and we believe they are a good purchase.

Fall goods, namely, Stove Boards, Elbows, Dampers, Fire Shovels, Oil Heating Stoves, Hand Sleds, Soapstone Foot Warmers, Buck Saws, Crosscut Saws, Steel Traps, Ice Skates, Ammunition, Guns, &c., are now going forward in good volume. Orders are being booked quite freely for spring shipment for Lawn Mowers, Rubber Lawn Hose and Accessories, Ice Cream Freezers and Natural Gas Stoves.

Just one more thing will add to the peace, comfort and happiness of our people, and that is to load American goods in American built ships, manned by American sailors, who are paid American wages to distribute our United States goods in South America, the Occident, the Orient and the islands of the seas.

Nashville.

GRAY & DUDLEY HARDWARE COMPANY.—The improvement in business which we noted in our last letter has gained some momentum in the past two weeks, and trade is in a fairly satisfactory condition at the present time. It is much better than it has been at any time for the past 18 months.

While crops in the South haven't been heavy this year, they have, in the main, been saved in good condition and sold at a handsome price, thus putting the farmers in a very easy financial condition. We still depend very largely on the farmer for our prosperity; when he is prosperous we feel confident that we will get our share.

The improvement in business which commenced in August is more noticeable at this time and we feel quite confident that by the first of 1910 business will have reached its normal condition. The \$3.50 per ton advance in the price of pig iron is beginning to have an effect upon manufactured articles, and we now have an advancing and very firm market, which is always conducive to large sales.

The spirit of conservatism in buying goods which has prevailed throughout this section in the last two years is not entirely wiped out, but when the buyer sees that he bought 10 dozen when he needed 20 dozen and had to pay the advance on the second 10 dozen, he will soon learn to increase the quantities of his orders so as to cover his requirements for a reasonable length of time.

Much interest is manifested in the approaching conventions of manufacturers and jobbers at Atlantic City. In addition to attending to the regular business of the associations, the members will have opportunity to confer with friends from all sections of the country, thus giving them a better line on the general situation throughout the country.

St. Louis.

NORVELL-SHAIPLEIGH HARDWARE COMPANY.—Generally speaking, everything seems to be lovely, except in the cotton growing sections. Our salesmen write us that the very high prices paid for cotton go a long way toward making up for the shortage of the crop.

We are glad to report business satisfactory, with excellent prospects of a good trade throughout the rest of the year.

All St. Louis this week is decorated for the centennial celebration. This centennial celebrates, not the founding of the city of St. Louis, but the organization of the village into a city with a full-fledged city charter. The Business Men's League of St. Louis has engaged Dr. Cook to give an illustrated lecture next Wednesday evening at the Coliseum, telling how he discovered the North Pole. The Aero Club of St. Louis has secured Glenn H. Curtiss to give an exhibit in his aeroplane. There will also be other aviators, dirigible airships and little and big balloons galore.

The aeronautic events will naturally attract the greatest attention. To be in with the spirit of the week this company will give away 5000 toy balloons appropriately inscribed with our trademark and house slogan. It seems an easy matter to buy and give away balloons, but we have found from experience it is quite a complicated process. We first had to learn where to buy the balloons. They were shipped to us "knocked down." We could not get a freight rate on 5000 inflated balloons. Then we had to establish a gas making plant to supply the water gas, composed of sulphuric acid, zinc and water. Then we found, as these balloons will last only 24 hr., it was necessary to have a force of men fill the balloons with gas by working all the previous night. We arranged a balloon factory with a capacity of 1000 balloons in 10 hr.

The next problem was how to distribute the balloons in a crowd. One man can carry about 50 balloons at a time. At first we thought of sending out 20 men with 50 balloons each. Then it was suggested these men would be mobbed. Finally we decided to distribute the balloons from a stake wagon. The suggestion was made that somebody might drop a lighted cigar from a window on the wagonful of balloons and then there would be an explosion. To overcome this it was necessary for us to make a wagon-top of a close mesh of wire netting. We now trust we have done away with all difficulties in our effort to distribute 5,000 balloons.

The balloon rather appeals to us as an advertising medium because, as they are held by a 6 ft. string, every person carrying a balloon on the street will do his part to act as a walking advertisement of our particular trade-mark. We are now looking forward with interest as to whether our factory will blow up some evening or whether our wagon will blow up before it delivers the goods.

Among the other events on the aeronautic grounds will be the sending up of a number of large advertising

balloons. These balloons will be 25 ft. in diameter. Each balloon will carry the trade-mark or advertising matter of some St. Louis house. Attached to the balloon will be a card instructing the finder to return it, giving the exact location where found. The advertising balloon found the greatest distance from St. Louis will receive a handsome prize from the Aero Club. We therefore trust the staff of *The Iron Age*, in their high location in New York from which they survey the trade of the country, will not be surprised if the latter part of next week some of these balloons come knocking at their windows.

As this Centennial will be a municipal function some 3,000 mayors in Missouri and in sister cities were invited to be our guests. A perusal of this list of mayors shows the Hardware business is not so slow when it comes to mayoralty honors. We find on this list of mayors a large number of Hardware merchants. We are also interested in observing on the entire list there is only one traveling salesman who has the honor of being mayor of his town. Another interesting fact in connection with the long list of mayors is the number of physicians who preside gracefully over the destinies of their towns.

We have read with interest of the Hudson-Fulton celebration in New York. From our friends in Manhattan we have received handsome literature bearing on this event.

These celebrations not only give honor to the heroes of the past, but lead us to brush up our knowledge of history—they are stimulating to the imaginations of both old and young—and in the exchange of courtesies many acquaintances and friendships are made which may be a source of profit and pleasure for a number of years.

Philadelphia.

SUPPLEE HARDWARE COMPANY.—Much has lately been printed in the newspapers throughout the country regarding our imports and the greatly improved financial conditions of the entire country. Losses by failure have lately been less than at any time since the middle of the year of 1907. It is reported that the distribution of cash in the way of interest and dividends the early part of October will be in excess of \$161,000,000, which is far beyond that of 1908, and we think of 1907.

Early this year during the session of Congress it was estimated that current receipts were not sufficient to meet demands and the issue of new certificates was considered; but with the improvement in receipts it is now anticipated by bankers that it will not be necessary to issue new certificates and it is believed that the country is entering on the greatest era of prosperity ever known.

Railroads throughout the country are making great improvements as a result of increased business, and we know the Pennsylvania Railroad is giving out very large orders not only for this year, but extending far into the next. Iron and Steel orders received extend the general output largely and these orders will probably break all former records.

Our country is largely marketing abroad both cotton and wheat and our corn crop is in excess of all former crops. How much corn will be sent abroad is not yet announced, but about one-half of our cotton will be exported, it is stated, and it is now bringing much higher prices than for the past two years.

The manufacturing conditions of the country have materially improved during the last two months. We refer not only to Hardware products but to manufactures of all kinds. Makers are doing their best to fill orders, knowing that the usual November and December trade is large, and this year no doubt the business of these months will be in excess of 1907 and 1908. It is also thought that the Hardware trade of our city will be larger during these months than ever before.

The National Hardware Association and the American Hardware Manufacturers' Association will meet next week at Atlantic City and no doubt the sessions will be more largely attended than in former years. It is intimated that Dr. Cook, of North Pole fame will be in attendance at the annual banquet.

The business situation certainly has a very favorable appearance at the present writing.

Louisville.

BELKNAP HARDWARE & MFG. COMPANY.—After a summer of unusual heat we plunged as in the wake of the great gulf hurricane, into late fall or almost winter temperature. The early frost made the tobacco men bestir themselves, as this is one product of the soil so delicate that it has to be gathered into the barns just at the right time. The various associations which are supposed to be for the farmers' protection, and would insure a high price are having meetings day by day with the effort to make the pooling of burley or of the dark leaf more nearly unanimous than it is at present. Only little more than half the acreage has come into the burley pool, for example.

In the meanwhile, the lawless element, which in the cities is known as a mob, and in the country hereabouts as Night Riders is unhappily asserting itself. It will continue to do so until it receives a more severe check in the courts, or at the muzzle of a well-directed shot gun. It is not very flattering to the majority of mankind, whether in Indiana, Ohio or Tennessee, to note how soon the brutish nature dominates or strives to assert itself when fear of punishment is somewhat remote.

Recent advances in sheet, pipes and steel products of all kinds indicate that we may soon have it in the smaller goods. Buying is becoming free and active, and there is every prospect that the trade, which was promised us several months ago, but was apparently side tracked, will come along in time to greet the New Year of 1910, if not to be classed as a Christmas gift. It is not so difficult to read the market quotations now that the baseball news is pretty much left out of the newspapers. However, we are tempted to fill up our time with the accounts of New York's wonderful pageants by land and sea.

Peary and Cook, too, have their adherents on one side or the other, inland as well as on seaboard. We shall have some new developments of circumstantial evidence on both sides before we get through, and there may be fine drawn disputes as to whether the soles of Cook's fur boots were worn exactly as polar ice would wear them. This indenture witnesseth is the way the legal document begins and possibly we shall come to that for our convincing evidence. It seems singular enough that Peary should have allowed a negro the privilege denied his English white brother. Now, if he had been in search of the equator we could understand the prominence given to one of the darker skinned race. Nothing would have seemed more improbable, a short time ago, than that a negro above all others should be able to wallow 'mid Arctic snows. It is inexplicable and upsets all our preconceived notions.

Baltimore.

CARLIN & FULTON.—The fall season is rapidly passing, and the demand for the Apple Parer and Copper Kettle will now be succeeded by that of the Sausage Cutter and Lard Press.

The agricultural fairs are over, and the awards have been made for the cattle with the longest pedigree, for the horses with most style and speed, for the weightiest hogs, the biggest pumpkins, the handsomest quilts and the most toothsome preserves. The latest Reaper and the most improved Mower have been shown, discussed and embellished with an appropriate medal.

The bracing air of the autumnal days suggests the gun and the dog and a tramp over field and through woods after the elusive "Bob White." The baseball diamond is now deserted, while the football field is the arena for youthful energy, muscle and skill.

It is not only the necessities of our civilization that produce business, but commercialism lays hold upon our recreation as well, and the Hardware business draws large revenues from the sale of goods adapted to our pleasures as well as our work. These changes of season, therefore, are of immense benefit to trade, and while a uniform temperature might be pleasant and beneficial from one point of view, the advantages would not compare in our opinion with the section where a change of temperature produces new wants.

The agricultural community regrets exceedingly that

this section has been favored with so little rain, and the continued drought has injured very greatly the corn and pastures and the prospects are that high prices will prevail throughout the winter for all dairy products and for hay and corn as well.

There seems to be quite a tendency toward a stiffening of prices for manufactured goods, and nearly every day or two brings an announcement of some higher quotation, resulting, it is claimed, from the advancing cost of raw material and an increased demand. It is to be hoped that the manufacturers will not consider an activity in business a necessity for higher prices. We hope that they will be satisfied to have their furnaces and mills at work without thinking that higher costs should necessarily result therefrom.

Reports from all lines of business indicate a continued improvement, though there are some sections in which trade has not revived to the extent hoped for owing to the crop conditions, but generally speaking there must be a much greater distribution of merchandise, as is shown by transportation reports.

NOTES ON PRICES.

Wire Nails.—The recent improvement in demand indicates that Nails ordered from the mills at the lower prices ruling during the early part of May have been about disposed of, necessitating the trade to replenish their stocks. A heavier volume is expected to characterize the market for the remainder of the year as indications point in this direction. The market is referred to, as being steady at regular prices. Quotations are as follows, f.o.b. Pittsburgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads to jobbers.....	\$1.80 ⁺
Carload lots to retail merchants.....	1.85
Less than carloads to jobbers.....	1.85
Less than carloads to retail merchants.....	1.95

New York.—A continuation during the past week of the Hudson-Fulton celebration, when three half-holidays were generally observed by the trade, has interfered considerably with business. Now that this interruption is a thing of the past business is expected to resume its regular course. Prices remain unchanged for small lots from store, which are generally held on the basis of \$2 per keg.

Chicago.—Most of the low price contracts taken last spring have been executed by the mills, which are now finishing up the small tonnage of \$1.70 business yet remaining on their books. Meanwhile there is some new business being placed at the ruling price of \$1.80, but the volume of such orders is comparatively light. Conditions, however, continue favorable to a steadily increasing demand as the season advances. We are advised that prices are being firmly maintained at the following quotations: \$1.98, Chicago, in carloads to jobbers, and \$2.03 in carloads to retailers, with an advance of 10 cents for less than carloads from mills.

Pittsburgh.—In the last week or 10 days a material improvement in new demand is reported by local mills. This is probably due to the fact that orders and contracts taken at the \$1.60 and \$1.70 price have nearly all been specified for and jobbers and consumers are coming in the market again to replenish their broken stocks. A good deal of tonnage that was not specified for, and taken for shipment prior to October 1, has been cancelled. The general condition of the Wire Nail market is referred to by the mills as being very satisfactory and all indications point to a heavy volume of business over the balance of this year. We quote Wire Nails at \$1.80, base, f.o.b. Pittsburgh, in carload and larger lots, and the market is firm.

Cut Nails.—The market is showing additional strength, as 5 cents more per keg is being asked by some manufacturers. A fairly heavy demand is reported in the way of new business, which is supplemented by specifications on contracts in good volume. Quotations are on the basis of \$1.80 to \$1.85 per keg in carload and

larger lots, f.o.b. mill, with \$1.80 regarded as the minimum price with the majority of manufacturers.

New York.—The local conditions in the Cut Nail market are the same as with the Wire Nails, consequently demand has been comparatively light. Small lots at store are generally held at \$2 per keg, base.

Chicago.—A fairly good demand is experienced by both mills and jobbers and the latter are specifying more liberally for the renewal of broken assortments. Prices are firmer, the minimum being represented by the following quotations, some mills asking 5 cents per keg more. In car lots to jobbers, Steel Cut Nails, \$1.93; Iron Cut Nails, \$2.03.

Pittsburgh.—New demand for Cut Nails is fairly heavy, and specifications against contracts are coming in freely. In sympathy with higher prices on raw material, Cut Nails are showing greater strength and we quote at \$1.80 to \$1.85 f.o.b., Pittsburgh, in carload and larger lots. We are advised that \$1.80 now correctly represents minimum of the market.

Barb Wire.—Conditions in the Barb Wire market are unchanged, manufacturers still engaged in making shipments on remaining unfilled portions of orders taken at the low prices for May. New demand is moderately heavy, but is expected to increase in volume. Quotations are as follows, f.o.b. Pittsburgh.

	Painted.	Gal.
Jobbers, carload lots.....	\$1.80	\$2.10
Retailers, carload lots.....	1.85	2.15
Retailers, less than carload lots.....	1.95	2.25

Chicago.—Not much unspecified tonnage taken at the prices established by the reduction in May remains unfilled and the shipments going forward from the mills will soon clean up all low-priced contracts. New business is developing slowly and buying at the new prices has not yet begun in earnest. Trade in the South is gradually improving, although in a few sections it is still backward. The market is firm at the following quotations: To jobbers, Chicago, carloads, Painted, \$1.98; Galvanized, \$2.28. To retailers, carloads, Painted, \$2.08; Galvanized, \$2.38; retailers, less than carloads, Painted, \$2.18; Galvanized, \$2.48. Staples, Bright, in carloads, \$1.98; Galvanized, \$2.28; carloads, to retailers, 5 cents extra, with an additional 10 cents for less than carloads.

Pittsburgh.—New demand is fair, but is not especially heavy at this time, as the mills have not yet shipped out all the tonnage contracted for when prices were on a lower basis. This tonnage, however, is being diminished very fast and within a short time will all be shipped out. The market is firm and we quote Galvanized Barb Wire at \$2.10 and Painted at \$1.80, in carload and larger lots, f.o.b. Pittsburgh, subject to usual terms.

Fence Wire.—Manufacturers of Wire Fencing are urging mills to make prompt shipments on orders placed some time ago. New business at prices ruling at this time is in fair volume. The market is very even in the matter of price, quotations to jobbers in carload lots being as follows, on a basis of \$1.60 for Plain and \$1.90 for Galvanized, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days, the usual price to retailers being 5 cents additional:

Nos.....	0 to 9	10	11	12 & 12½	13	14	15	16
Annealed.....	\$1.60	1.65	1.70	1.75	1.85	1.95	2.05	2.15
Galvanized.....	1.90	1.95	2.00	2.05	2.15	2.25	2.35	2.45

Chicago.—The bulk of the business now moving is comprised of specifications against existing contracts. Consumers are urgent in their demands for shipments and manufacturers generally are very busy. New demand is light since the present requirements of most consumers are well covered by purchases made some time ago. The market is steady and firm and we quote as follows: Carloads, to jobbers, \$1.78, base, f.o.b. Chicago.

Pittsburgh.—The mills have pretty well cleaned up old contracts taken when prices were lower than they are now, and there is a fair volume of new business, all of which is being entered by the mills at full prices. We quote Galvanized at \$1.90 and Plain Wire at \$1.60, in carload and larger lots, f.o.b. Pittsburgh, subject to 2 per cent. discount for cash in 10 days.

Registers.—Cast Iron Registers of recognized quality are now being quoted to the regular trade in moderate quantities at 70 per cent. discount. Large faces, 14 x 14

in. and over, are subject to a discount of 75 to 75 and 10 per cent. The trade on the regular line is referred to as below normal, and about equal to 1908, which was from 20 to 30 per cent. in volume below the two preceding years. It is also true that there are Registers on the market that are being offered at substantial concessions from these prices.

Bright Wire Goods.—The advance in Bright Wire Goods, made September 16, is being exceptionally well maintained, and concessions sometimes obtainable are apparently not being made.

Tinware and Sheet Metal Goods.—The market in Tinware and Enameled, Japanned and Galvanized Wares remains in the demoralized condition which has characterized it for some time, but the higher prices for Sheets and Tin Plate affects the cost of manufacture and will doubtless have influence on prices as soon as competition becomes less acute and a good demand sets in.

Merchant Pipe.—Merchant Pipe in Steel and Iron is stronger, and with recent advances the tendency is in the direction of higher prices.

Furniture Nails.—As intimated in a previous issue as likely to occur, lower prices have been decided upon for Furniture or Upholsterers' Nails. The more popular numbers, such as 41, 42 and 43, are obtainable at 50 per cent. discount and Nos 3 to 19 at discount 40 and 10 per cent. This move is the result of changed conditions owing to the new customs tariff and is intended to counteract any tendency to import these goods.

Crow Bars.—Crow Bars, following the lead of similar lines of heavy Hardware are being more firmly held since October 1, quotations for small lots from jobbers ranging from 2¼ to 3 cents per pound.

Picks and Mattocks.—The prices of Picks and Mattocks, while unchanged apparently in the announced discounts, are for practical purposes higher because of the abridgment of concessions heretofore obtainable, the market now being represented by a discount of 75 per cent. for ordinary retail purchases.

Copper Goods.—So far the market for Copper products shows no indication of keeping step with the higher prices in Steel and Iron products, which is probably accounted for by the steady production of the metal during the depression and an accumulation of stock in excess of legitimate demands, as there are no large propositions in the market requiring quantities of Copper and no big transactions. The business in this commodity is variously referred to as close to normal, and dull. By some of the trade in close touch with the largest interests it is believed that while Copper will at the proper time get on a higher level, it will lag considerably behind the Steel market. Copper goods and those in which this metal is an important material are as a rule held at steady prices.

McKinney Mfg. Company.—Owing to the continued increase in cost of production McKinney Mfg. Company, Pittsburgh, Pa., has withdrawn all prices and issued under date of September 23 discount sheet No. 19 covering all lines they manufacture. The new prices show an advance of from 7½ to 10 per cent. on Strap and T Hinges, Wrought Steel Butts, Wrought Steel Japanned, and Wrought Steel Plated Butts of all kinds.

Rope.—Business is reported as fairly good, orders being for larger quantities and more frequent, but lacking the snap of two years ago. Some manufacturers are attempting to get higher prices for Jute Rope than have been ruling, but the production exceeds the demand at this time. The following quotations represent the market for moderate quantities: Pure Manilla of the highest grade, 8 to 8¼ cents per pound; lower grades of Pure Manilla, ¼ to ¾ cent less than the foregoing quotations. Pure Sisal of the highest grade, 7½ to 7¾ cents per pound, base; Commercial grade, 6¼ to 6½ cents per pound. Rove Jute Rope, ¼ in. and up, No. 1, is quoted at 5 cents per pound.

White Lead in Oil.—At this season the demand is not expected to be large. The market is firm and buying is of the routine sort. No change has taken place in prices, and quotations are as follows: In 100, 250 and 500 lb. kegs, 6¼ cents per pound; in 25 and 50 lb. kegs, 7 cents per pound, with the usual advances on smaller packages.

Linseed Oil.—New Flax Seed is coming into primary markets in the Northwest very slowly, notwithstanding the prospects of a large crop. Scarcity of Seed is reported as being responsible for the closing down of some crushers' plants, while the quantity of Oil available is referred to as being limited. Under these conditions crushers are not inclined to make contracts for nearby delivery. Buyers are waiting for lower prices before placing large orders, and some have not drawn all the Oil due on contracts. The next two weeks may see a stronger market if the demand should increase. The New York market remains unchanged on the basis of 50 cents for Western Raw in 5 bbls. and over; Boiled Oil is 1 cent advance per gallon on Raw.

Spirits Turpentine.—There has been comparatively little buying in this market during Celebration Week, but the trend of the market has been toward higher prices owing to active demand in the South, with light receipts. According to the views of some in the business, all indications point to a much smaller output for next season than the present one, if the factors have the power to restrict the quantity of Turpentine produced for the crop of 1910-1911. The New York market is represented by the following quotations: Oil Barrels, 61 to 61½ cents; Machine Made Barrels, 61½ to 62 cents.

Window Glass.—The prices which hand operated Window Glass manufacturers have agreed upon are as follows: Single Strength, 90 and 30 per cent. discount, except the first three brackets of B Single, on which the market was left open; Double Strength, 90 and 35 per cent. discount, from the manufacturers' list of January 1, 1901, factory shipments. The strike in the factories of the American Window Glass Company is considered as practically at an end, although many of the workmen are still holding out. No report has been received this week from the committee having the formation of the Imperial Window Glass Company in hand. Under normal conditions the demand for Glass should exceed production at this season, but jobbers throughout the country are pretty well stocked up with Glass purchased at 90 and 40 per cent. discount for Single and 90 and 45 for Double, and possibly at even lower prices than these. Until these stocks are somewhat depleted in assortment it is not probable that jobbers will be large buyers. Starting as many hand plants as possible appears to be the tendency, including some that were not in operation last year. The formation of the Imperial Window Glass Company seems to be the only way in which supply can be regulated according to demand. Prices recommended by the Eastern Window Glass Jobbers' Association, from jobbers' list, October 1, 1903, for territory east of the Allegheny Mountains, are as follows: New England States, from jobbers, Single, 90 and 30 per cent., and Double, 90 and 35 per cent.; New York State, Single, 90 and 30 per cent., and Double, 90 and 35 per cent.; New York State, factory shipments, Single, 90 and 40 per cent.; Double, 90 and 45 per cent.; in the Southern States discounts vary from 90 and 20 to 90 and 30 per cent. on Single and from 90 and 25 to 90 and 40 per cent. on Double. Under the light demand these prices are not always strictly adhered to.

ALMOST every shipper has suffered more or less inconvenience from shipments delayed through miscarriage, but few, perhaps, have experienced the extraordinary delay which according to a newspaper report befell a shipment consigned from Boston to a Hardware firm in the State of Washington. A package of rope, it is stated, was consigned to this firm by freight over the Northern Pacific Railroad from Boston, August 8, 1906, and only reached its destination on the 24th ult., being three years on the road.

JAMES B. SIPE & Co., N. S., Pittsburgh, have recently appointed A. W. Cobb, 423 Chamber of Commerce Building, Chicago, Ill., to represent them in Chicago and vicinity in the sale of Sipe's Japan Oil and Sipe's Japan Spirits.

Holiday Trade in the Hardware Store.

Good Profits Reward Those Who Give Proper Attention—Importance of Buying Early—Arranging Windows and Store—Children a Factor—Attracting the Public—Storing Goods for Later Delivery—Consideration for Clerks—Goods Which May Be Advantageously Handled.

IT may be rather hard to get up Christmas enthusiasm at so early a date as the present, as cold weather and snow are helps to the imagination in planning for the arrangement and display of holiday goods. The wise merchant, however, who contemplates meeting competition in this line will not delay placing his order for such goods as he may require, and shaping his Christmas policy without delay to the end of being better prepared for this profit paying business than any of his neighbor merchants.

Buying Early.

An early start in this direction insures larger and better assortments of goods to choose from, as later these will be more or less broken after others have made their selections. The first of December is none too early to have holiday goods displayed. After purchasing the goods best suited to the trade for which they are intended, plans can be formed for arranging them to the best advantage.

Window Dressing.

More or less elaborate preparations will need to be made for window dressing which may require steps, platforms, stands, &c., for showing the goods in the most tempting manner. In these preparations the clerks should be interested, and they will most likely advance some valuable ideas and at the same time become enthused with the project.

Special Features.

In addition to displaying goods in the most enticing manner, some plan may present itself to reproduce special features about the town, which will be readily recognized and will add to the interest of the store. Something in motion can probably be introduced, if nothing more than a revolving stand, while moving figures would be better.

Interesting Children.

A large part of holiday trade results from children seeing what most interests them, and telling their parents that they want this or that which they have seen in Blank's show window, so it is well to keep the children in mind when making displays of this kind.

Window Decorations.

Window trimming will have to be considered. In this connection crepe paper can play an important part. This can be obtained in a large variety of colors and is capable of being used in numberless ways. Cotton, greens and the arrangement of lights are also worthy of careful consideration. There is no doubt that store windows influence many persons as to where to spend their Christmas money, as the windows give an idea of what may be found inside.

Interior Decorations.

Some scheme of decorating the inside of the store, especially near the front, should not be overlooked. Greens and crepe paper recommend themselves for this work, also Japanese lanterns. It is well to keep the latter lighted during the day as well as at night, which is easily accomplished if electricity is at command. This attracts especial notice and favorable comment, as it is unusual to see a store lighted during the day.

Arrangement of Goods in the Store.

The regular goods in the front part of the store will naturally give way to holiday articles which may be ar-

ranged so as to show off to the best advantage, by giving them sufficient space on stands or counters so as not to appear crowded, and to permit customers to examine them critically.

Reminding the Public.

It will pay to use enlarged space in the newspapers, and by other advertising to inform the public at large that the store is headquarters for a large and varied stock of holiday goods. Attractive circulars can be mailed and otherwise distributed to customers and to the public in general. Illustrations of the goods adds immensely to the effectiveness of this advertising. Deciding early in the season what goods are to be offered, arrangements can be made to secure electrotypes to illustrate the advertising, which probably could not be readily done at the eleventh hour.

Delivering Christmas Gifts.

Customers appreciate the convenience of having purchases stored until Christmas eve, or until such time as they may designate, and it would be well to emphasize this feature in the advertising as it will induce early buying. This plan can be carried out by foresight in arranging for such deliveries.

Remembering the Clerks.

A great deal of extra work necessarily devolves on clerks from the time the goods are received and arranged in the store until the establishment closes late on Christmas eve. While the inspiration of the Christmas spirit, loyalty to the store and the desire to "make good" makes them attentive and courteous to customers and carries them through if nothing better is offered, the plan has been successfully carried out of profit-sharing, by offering a bonus of 1 per cent, on sales of all articles designated as Christmas goods sold during the month of December. To work off odds and ends and slow selling articles an additional 5 per cent may be offered with good results.

Goods Featured for Holiday Trade.

From the accompanying list of goods selections may be made that will be found desirable and profitable to include in the holiday stock. Many of these are carried regularly in most stores, and may be supplemented by higher priced articles in the same line for which there would not be a call at other seasons of the year.

GOOD SELLERS DURING THE HOLIDAY SEASON.

Art Metal, Metal Work and Tools.
Tool Cabinets and Chests.
Leather Novelties.
Smoking Sets.
Manicure and Toilet Sets.
Thermometers.
Fire Place Goods.
Bird Cages.
Carpet Sweepers.
Call Bells.
Carvers.
Table and Pocket Cutlery.
Crockery Jardinières.
Urns.
Umbrella Stands.
Feather and Fancy Dusters.
Brown and White Stoneware.
Lamps.
Gas and Electric Portables and Electroliers.
Chafing Dishes.
Five o'Clock Teas.
Coffee Percolators.
Tea and Coffee Pots.
Baking and Fern Dishes.
Glass and Ornamental Candlesticks and Shades.
Candelabra.
Cut Glass.
Sterling Silver and Silver Plated Ware, Flat and Hollow Ware.
Bread Boxes.
Cake Boxes.

Clothes Wringers.
Coffee Mills.
Denatured Alcohol Cooking Stoves and Smoothing Irons.
Electrical Cooking and Heating Devices.
Family Scales.
Gas Heaters, Ranges and Hot Plates.
Oil Heaters and Ranges.
Flour Bins.
Meat Choppers and Presses.
Roasting Pans.
Aluminum and Enameled Ware.
American Flags.
Automobile Lunch Basket Sets.
Fishing Rods and Reels.
Fishing Tackle.
Football Goods.
Foot Warmers.
Game Bags.
Gun Cases.
Guns.
Hockey Goods.
Hunting Axes and Knives.
Hunting Clothing.
Revolvers.
Child's and Bob Sleds.
Sleigh Bells and Chimes.
Skates.
Skis.
Snow Shoes.
Toboggans.

A Book on House Painting.

THIS book which is published by John Wiley & Sons, New York City, is a clear and practical handbook on the subject to which it relates, and will be of interest to hardware merchants, so many of whom are now handling paints. The work is divided into divisions rather than chapters, these dealing with materials, pigments, care of paint, brushes, exterior and interior painting, varnishing, floor finishing, painting structural metal, glazing, papering, whitewashing, kalsomining, and lastly, cold water paints.

Paint is a product the use of which is so universal, both for comfort and sanitary considerations, that it deserves intelligent study. In the compilation of the book the author, A. H. Sabin, simply and plainly demonstrates the use of preservative coatings of one sort or another for the protection and ornamentation of houses. He also states that an experience of many years in the manufacture and use of paints and varnishes is the foundation of the knowledge thus presented.

DANIEL HOLDER of the Holder Hardware Company, Bloomington, Ill., and a well-known and valued citizen, died September 28 from congestion of the lungs, following an attack of la grippe two years ago. Mr. Holder was the senior partner and had been at the head of the business since 1864. He was born in Fremont, Ill., May 5, 1844, and after completing a course of study at the Illinois Wesleyan University he entered the Hardware business established by his father. He was a member of the De Moloy Commandery, Knights Templar, and an attendant at the First Presbyterian Church. He leaves a widow and two children, the son, Samuel Holder, having been associated with his father in the business.

THE DAME, STODDARD COMPANY, a Massachusetts corporation, has acquired the business heretofore conducted by Dame, Stoddard & Co., 374 Washington street, Boston, Mass., and it is intended to continue to carry the same high grade line of merchandise as its predecessor. The officers of the new company are: Harry S. Lee, president; L. Dana Chapman, vice-president; Louis L. Lougee, secretary, and Wilson B. Varney, treasurer and general manager.

Working Up Fall Business in Stoves and Ranges

Methods Employed by an Ohio Firm

Special Inducements for Early Purchasers—Show Window Used to Good Effect—Following up Those Who Manifest Interest but Defer Buying.

WHAT can be done at this season of the year with a little enterprise and energy in pushing the sale of Stoves and Ranges is well illustrated in the story given below which describes some of the effective methods used by Ross & Hamlin, Wauseon, Ohio, who, besides giving prominent attention to this line, also handle Hardware, Paints, Brushes, Builders' Supplies, &c.

The experience of this firm has been that an early sale of these goods, in late August and the opening days of September, always pays handsomely, and in order to bring out advance orders it has been its custom to offer special inducements. The price, however, is never cut, as this is regarded as leading to dissatisfaction later.

**A Phonograph Last Year,
Half Ton of Coal This Year,
Free with Each Base Burner.**

During the season of 1908 14 Base Burners were sold in the last 10 days of August, with the thermometer in the 90's most of the time. The special offer to buyers at that time for an early order was a Phonograph free with each Base Burner.

This year the offer is a ½ ton of hard coal free with each Base Burner. A large poster making this announcement has been issued, in which the Base Burners thus featured are effectively illustrated and described. This poster is headed as follows:

EXTRAORDINARY OFFER!
1000 lbs. of Hard Coal Free
With Every Hard Coal Base Burner Sold
FROM SEPT. 1st TO SEPT. 10th.
You Save Dollars By Buying Now.

Window Display a Strong Feature.

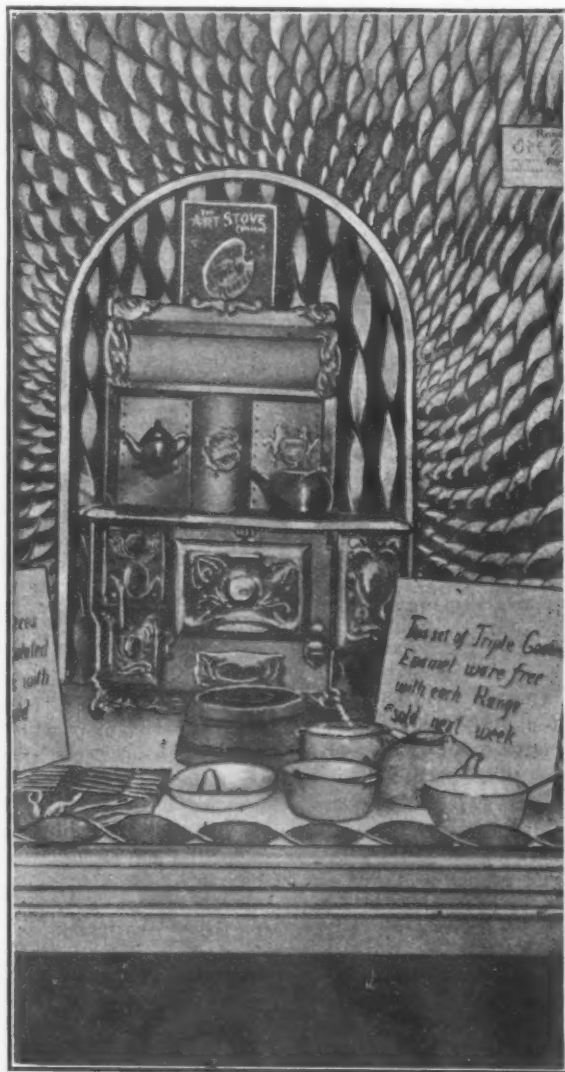
Of course, the firm gives special attention to its window display at this time. We reproduce herewith an exhibit which was found effective in connection with last year's sale of Ranges. The window is 7 ft. wide and 8 ft. deep, with an elevation to the floor of only 7 in. The background was an arch formed by a wagon rim just wide enough for the Range to set under nicely. All around the arch were fastened 3-in. strips of white crêpe paper about 1 in. apart, which were twisted and brought forward to the sides and top of the window. This produced a large funnel effect, with the Range in the background. With the arch trimmed and the floor covered with bright green crêpe paper it made an attractive window.

Set of Enameled Ware to Each Range Customer.

The articles in the front right hand corner were a set of Blue and White Enameled Ware, as follows:

One three-piece seamless Roaster.
One No. 9 seamless Tea Kettle.
One 6-qt. Pan.
One 8-qt. Berlin Kettle.
Three 9-in. Pie Plates.

This set of Blue and White Enameled Ware was given



Range Window Display of Ross & Hamlin.—The Sets of Enameled Ware and Silver Plated Ware Shown Were Given Away Free to Range Purchasers During Week of Special Sale.

away with each Range sold during the time the exhibit occupied the window.

Those Who Paid Cash Got Silver Plated Ware.

In the front left hand corner, which is not brought out so clearly in the illustration, was shown a set of 26 pieces of Rogers' Triple Plated Silver Ware as follows:

6 Table Knives.	6 Table Forks.
6 Tea Spoons.	6 Table Spoons.
1 Butcher Knife.	1 Sugar Shell.

This set of Silver Plated Ware was given away during the exhibit week as a special cash inducement to buyers. As a result of this offer to cash buyers, 24 Ranges were sold. The firm has given a number of these cooking exhibits, and the sales have never fallen below 14 Ranges, and have gone as high as 33.

Good Live Prospects Are Followed Up.

The exhibits are not only a success from the number of actual sales, but from a general store advertising

standpoint as well. The firm gets on the track of a large number of good live prospective customers, the following up of whom brings about additional sales in Ranges as well as other lines. In this connection the house uses a follow-up system of its own, changing it according to the season and the personality of the prospect; as a rule, the prospective buyer is pretty well known to the members of the firm.

One of the follow-up letters, which has thus been used, was as follows:

MAKE YOUR WIFE HAPPY AND SATISFIED.

A good Range is more of a necessity in the house than a Plow, Harrow or Mower on the farm. No farmer can do good work successfully with poor machinery. No mechanic can do good work with poor tools.

Neither can the wife or mother do good baking and always have the meals on time with a poor Range or Cook Stove.

The — will give perfect satisfaction at all times. It does not have spells and spoil your baking every little while. It is always ready to be heated up to the baking point in the shortest time of any Range on the market, and with the least amount of fuel, and the reservoir does not boil all the while you bake, either.

You can bake a pan of biscuits on the rack and another on the oven bottom and both will brown evenly and be done at the same time.

These are just one or two of the good features which, together with the low prices, enable us to sell the great numbers we do.

Another form not only directs attention to their high priced line, but also refers to another make, which is offered at a lower price. A third letter, in which some of the salient features of the Range were emphasized, ran as follows:

We have written you a little about our — Ranges, but are unable to do them justice on paper. Up to this time, we have mentioned but a few of their "Different from Other" features. You do not know of their solid copper 10-gal. reservoir that will boil water without having to heat the oven and without any fire, gas or creosote coming in contact with it. Think what that means. It will never burn out nor rust out, and is the only reservoir on the market that is under perfect control.

It is the only Range with an indestructible oven top. Why?" Because it has three thicknesses, while most others have only one, and a few, two thicknesses. They will bake faster, even, with less fuel than any other. They have two flues under the oven bottom to bring the heat back to the top, carrying it in this way 5½ ft. farther than in any other before letting it escape.

Look at the back of all other Ranges and see the flue that takes the heat out from under the oven and then look at a —. They have no flue there at all. Have you ever lifted a fireback used in a — to see how heavy it is and noticed the air ventilation we have back of it? You would say, "I do not wonder they last so long."

Have you seen how we clean the soot out from under the oven into the ashpan, instead of out into the room and getting dust and soot all over?"

Did you know that all the nickel plating is done on copper to make it stand the heat

without tarnishing and to make it easier to keep clean? Simply wash with soap and water. These are just a few of the "Something Different, Something Better" features they have.

As a result of the special efforts thus put forth, Ross & Hamlin advise us that these early sales have given handsome returns which fully justify the time and attention expended.

In addition, circulars and booklets, some of them furnished by the manufacturers, are circulated widely, not only on Stoves and Ranges, but on other lines, and in the spring and fall months at intervals about 30 days apart, something in the way of a store bulletin is issued.

Florida Retail Hardware Association.

A VERY creditable souvenir programme has just been issued in connection with the first anniversary convention of the Florida Retail Hardware Association, W. K. Jackson, secretary, Lakeland, which will be held in the Board of Trade Auditorium, Jacksonville, October 12 to 14. It contains nearly 70 pages, and in addition to the programme of the proceedings presents portraits of the officers and interesting association matter, as well as a large amount of advertising from manufacturers and jobbers.

Quite an elaborate programme has been prepared for the meeting including formal papers, as follows: "The Sale of Paint by Hardware Dealers," by J. H. Gay; "The Difference Between Cheap and Good Hardware," by John Hall; "Hardware Advertising," by R. D. Baldwin of the Simonds Mfg. Company, Fitchburg, Mass.; "How Best to Push Sales in your Sporting Goods Department," by John W. Watson; "What Is the Best Way to Handle Field Fencing," by F. H. Young; "What Are the Important Characteristics of a Clerk?" by Joseph Brumley.

All of these papers will be followed by general discussion, and in addition the following subjects will be informally discussed by two or more of the members:

"Transportation Service, Classification and Rates."

"Relation of the Manufacturer and Jobber to the Retail Dealer."

"Should the Retail Hardware Dealer Patronize a Jobber Who Sells the Consumer or Other Than Hardware Dealers in His Town or City?"

"Should There Be Any Change in the Exemption Homestead or Collection Law of the State?"

The programme also calls for addresses from C. H. Williams and M. L. Corey, president and secretary, respectively, of the National Retail Hardware Association, and from W. P. Lewis and C. A. Peck, who are prominently identified with Hardware mutual insurance companies. Provision has also been made for discussions of other topics which come up through the medium of the Question Box.

The entertainment side of the convention has not been overlooked, and on Tuesday evening the Jacksonville Board of Trade will give a smoker to the members; on Wednesday evening the Hardware jobbing houses of Jacksonville will banquet them, and on Thursday evening the local houses will give a river party with music and refreshments.

PRESIDENT HENRY F. KRUEGER AND SECRETARY C. A. PECK of the Wisconsin Retail Hardware Association visited Milwaukee on the 28th ult. and perfected arrangements in regard to the occupation of the new \$500,000 Auditorium during the first week of February next, when the annual convention and Hardware exhibition will be held. The hall of the Auditorium, which will be at the service of the association, is 100 x 225 ft., without pillar or post, so that manufacturers and jobbers will be afforded a splendid opportunity for displaying their goods.

J. SHINDEL KRAUSE of the Hardware firm of Krause & Bro., Lebanon, Pa., died on the 25th ult. Mr. Krause was in the fifty-fifth year of his age.

Novel Features of Store Arrangement

Ordinary Show Cases Discarded Entirely and Standing Cases Substituted

System of Sampling and Pricing Goods

THE accompanying illustrations relate to original ideas embodied in the arrangement of store fixtures and samples in the store of J. Gabriel & Co., 672-676 Grand street, Brooklyn, N. Y. Show cases of the regular pattern have been discarded entirely, as occupying too much space in proportion to the benefit derived from their use, and in their place standing cases of the type shown in Figs. 1 and 2 have been substituted.

The Pocket Cutlery Case.

The case for Pocket Cutlery, Fig. 1, is 7 $\frac{3}{4}$ in. deep, 24 in. long and 33 in. high, and stands on the end of a counter. The back is of boards, the front and front side of glass, and at the back end is a hinged door with lock and key. The case contains seven drawers, 5 $\frac{1}{4}$ in. wide and 22 in. long, ranging from 4 in. in height for the upper drawers to higher ones below to accommodate heavy two-bladed Knives. The drawers rest on shelves, and the side on which samples are shown is set back far enough to accommodate the samples and to allow the drawers to be pulled out at the back. In the illustration the one drawer

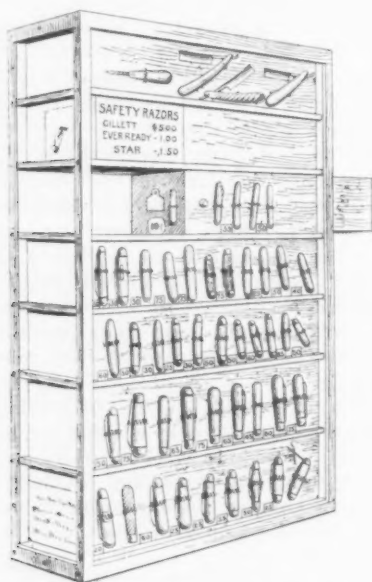


Fig. 1.—Upright Cutlery Case Standing on End of Counter Having Hinged Door with Lock and Key at the Back.

is shown part way out, to indicate how the drawers work. The drawers are divided into compartments by wooden partitions which slant slightly toward the back end of the drawers, one compartment for each Knife sampled and in which the stock is carried. Small price cards tacked to the drawers are placed at the bottom and to the left of each Knife. The samples are held in place by pieces of small coiled brass spring wire fastened at each end. This coil spring is purchased by the yard. At the back end and near the top of each draw is a 1-in. auger

bit hole to provide means of pulling the drawers out. The apparent advantages of this arrangement are that the samples are nearer in the line of vision and can be examined more critically than if in the ordinary style of show case, thus almost entirely eliminating the handling of various Knives by customers before deciding which they will buy. In the top drawer are Razors and Manicure Goods, in the second Safety Razors, while those below are devoted to Pocket Knives.

Showcase For Tools.

Showcases like that illustrated in Fig. 2 are placed along the front edge of the counters, and are devoted to carpenters' and machinists' tools, &c. The cases are each 7 $\frac{1}{2}$ in. deep, 31 in. high and 28 in. long. Each case has

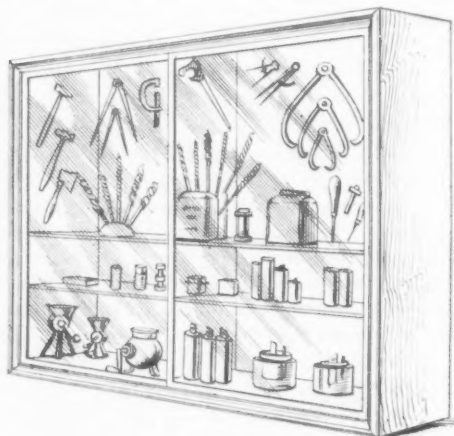


Fig. 2.—Showcase for Tools Placed Along Front Edge of Counters with Sliding Glass Doors Fastened with Lock and Key.

two sliding glass doors, which will pass, fastened with lock and key. Some goods are sampled on the wooden backs of the cases, while smaller articles are laid on shelves.

Advantageous Method of Sampling and Pricing Goods.

A plan of sampling and pricing shelf and other goods, which lend themselves to such an arrangement, is gradually being extended throughout the store, and is

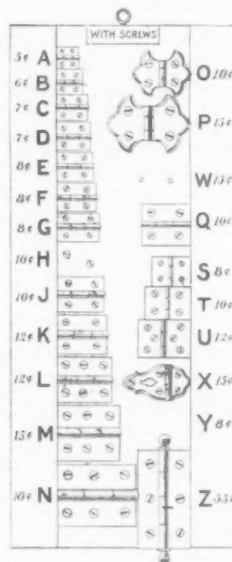


Fig. 3.—Entire Line of Wrought Butts Sampled on Board with Prices and Box Letter in Which Butts Are Kept.

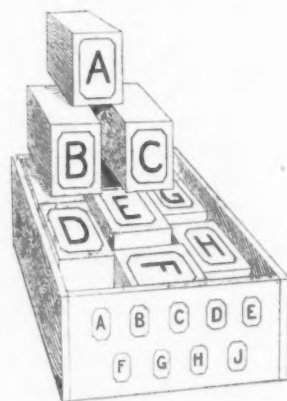


Fig. 4.—Shelf Drawer Containing Wrought Butts, Original Boxes Lettered to Correspond with Sample Board.

illustrated in Figs. 3 and 4. In Fig. 3 are shown samples of the entire stock of the Wrought Butts carried, on a board 8 x 18 in. in size, on each edge of which are

strips of white cardboard. Opposite each sample is a 1/2-in. black gummed letter and the selling price of the Butt, and at the top of the board are the words "with Screws." On the back of the sample board is a memorandum of the cost and selling prices of the Butts.

The advantage of this arrangement is that when a customer asks for Wrought Butts he is shown the sample board and can see the entire stock and prices at a glance, making it easy for him to select what he wants. This insures quick sales by obviating the necessity of taking down one or more shelf drawers and opening several of the small boxes. It also prevents mixing the different sizes and styles of Butts in the drawers.

In addition to Butts, Paint Brushes, Drawer and Shutter Knobs, Door Keys, Iron and Wood Screws, Staples and Nails are sampled on boards. It is the intention to have the sample boards of shelf goods of uniform size, and to keep them under the shelf ledge, arranged to slide on runways.

Carpenters' Tools.

Hand and Hack Saws, Braces, &c., are hung on pegs in sliding glass door wall cases, and all bright goods are given a thin coat of vaseline when received, to prevent rust from dampness and finger marks. In Fig. 5 is shown a simple and ingenious plan for telling, at a glance, the length and points to the inch of each Saw. This is done by folding wrapping paper about the point of the Saw

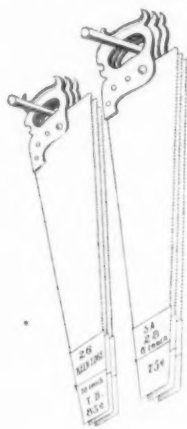


Fig. 5.—Saw Information—Length, Points and Price of Each Saw.



Fig. 6.—Mica Sampled, Size and Price Showing Through Each Piece.

and tying it with twine. On this paper the desired information is marked with black crayon, together with the cost and selling price.

Mica Sampled in a Way to Overcome Annoyances.

It is curious the number of people that imagine that mica is carried in large sheets, and that they can have the sized piece that they guess they want, cut from a sheet. If stock sizes are given customers to select from, the rough handling is apt to break the pieces, and when picking out what is wanted the thickest sheets are always chosen.

To prevent these annoyances Mica samples are arranged so that they can be seen, but not conveniently handled. This is done on two boards, 3-16 in. thick, each 12 in. wide and 18 in. long, hinged along the 18-in. edges, to open and close like a book. On the upper surface of the boards, when open, each size of Mica carried in stock is fastened by a tack in each corner. Before the Mica is tacked down a gummed label is stuck on the board, on which the size, cost and selling price is marked. The appearance of a 4 x 5 in. piece of Mica thus sampled is shown in Fig. 6. Since this plan of sampling has been in force no Mica has been rendered unsalable, as the sizes indicated by the customer are taken from stock by the salesman and handed to the customer wrapped in paper.

A. J. Pierce, Tipton, Iowa, has purchased the Hardware business of D. R. Clark, Iowa Falls, Iowa.

Manufacturers' Prices to Small Jobbers.

Quantity Discounts and Classified Lists—System of Prices Often Aids the Largest Jobbers and the Syndicate Buyers, but Is to the Disadvantage of the Small Jobbers, Who Are Very Desirable Customers of the Manufacturers and Useful in Introducing and Distributing Goods.—Letter from a Well-Known Jobbing House.

To the Editor: I wish to be heard, and I trust that you will find space to print this communication with reference to the system employed by manufacturers by which they make prices to the jobbers and retailers in the United States who purchase and distribute their goods.

Their system has aided the syndicate buyers to the detriment of the small jobber; and, in fact, to the detriment of the manufacturers of the goods. The margin of profit left to the jobber is often inadequate, forcing him to do a business upon a percentage of profit wholly inadequate, based on the cost of distribution, capital invested, &c.

Illustration of an Unreasonable Rebate.

If I am correctly informed, the manufacturers of a leading line of Hardware recently met and made a discount of 70, 10 and 5 per cent. on one kind of goods, and 65, 10 and 5 per cent. on another. Beyond this schedule they have provided for a rebate of 5 and 2 1/2 per cent. to those who buy \$5000 worth in a year.

Now, then, \$5000 worth of these goods in 12 months is a great big lot.

Very few jobbers in the United States can handle that amount to advantage. It is, of course, a very easy task for the large jobbers in the large trade centers, but for a legitimate jobber in a city of 25,000 inhabitants, he would have no more use for \$5000 worth of the goods than he would have use for \$1,000,000 worth of Nails in the same length of time. The manufacturer simply says to the small jobber, henceforth you are to be barred from the participation in the profits of business in this line, and you may discontinue selling our goods; or you may take the other alternative, buy from some large jobber, or through a syndicate buyer.

This is all very wrong, a jobber cannot possibly handle this kind of goods and distribute them upon a margin of profit less than 20 per cent., and he has usually been in the habit of making more than that, because he cannot get a legitimate profit on the Nails, the Wire, the Horseshoes and Steel Roofing, on Tin Plate and a number of other staple items that he handles. Therefore he must of necessity, in order to remain in business, get a better profit on the small items in the Hardware business.

What is true of the line referred to is likewise true of a number of other articles that the manufacturer goes to the jobber, asks him to become his distributor, asks him and requires him to become the guarantor of all accounts sold by the jobber, because he becomes a mere distributor for the manufacturer, has no voice as to what profit he should ask or receive, and the manufacturer fixes it so that he must sell at as low a price as does his most favored large competitor. Since the manufacturer refuses and fails to pay the small jobber as great a percent. of salary, and that is, as great a per cent. of profit as he allows his larger rival, the small jobber finds himself underpaid.

Small Jobber Does the Pioneering.

In the treatment of the small jobbers the manufacturer makes a serious mistake, for the reason that the small jobber does the pioneering. He does more introductory work for the manufacturer than does the larger jobber; he gets much nearer to the retail seller and the consumer than does his larger rival, and in

that way induces the trial and use of new articles that might otherwise remain unprofitable to the manufacturer for years to come, and might not be introduced successfully except through the aid of the smaller jobber. Then this small jobber, who is the friend of the manufacturer, is underpaid by the same manufacturer, for whom he has been putting forth his best efforts.

I recognize the fact that there must of necessity be a difference in price. A manufacturer should sell goods cheaper to a legitimate jobber than he should sell them to the consumer or a retailer, yet, on the other hand, he should fix a price on his goods at which he is willing to sell them to a jobber, whether that jobber has 4 or 40 men on the road. The chances are that the jobber with the four men on the road will find it more difficult to sell his assortment than the man with the larger number on the road, and therefore the expense of doing business is greater for the amount of goods sold than to the larger one.

In spite of this, however, the small jobber is doing pioneer work and **should be paid the same per cent. of profit for the number of dollars' worth of business he does for the manufacturer as that same manufacturer pays to the more fortunate and larger jobbers located in the great trade centers of the United States.**

In the Interest of the Large Jobbing Houses.

The system in vogue now tends to increase the strength and power of the large jobbing houses and decrease that of the small jobber, for the very good reason that the small jobber is not taken into account when prices are fixed on commodities, where prices are agreed on by the manufacturer of such commodities. The thing that should be done is that the manufacturer should be sure that the jobber is a legitimate jobber and then give him the jobber's price. If he is able to do \$1000 worth of business, the profit should be such as to justify him pushing out and doing a greater amount the next year.

Some manufacturers will undertake to defend their position. The writer has had many years' business experience and finds that the tendency is to increase the strength of the strong and to weaken those who should be encouraged in their efforts in behalf of the manufacturer. Under the present system the manufacturers could easily be compelled by a dozen of the larger jobbers in the United States to accept such prices as those jobbers would see fit to demand, **and undoubtedly the present system of price fixing is due to the demands made upon the manufacturers by this same aggregation of very strong jobbers.**

A Combination Which Failed.

To illustrate again: The inconsistency of the manufacturer on such articles where the price is fixed and the quantity required to be taken is so great that the small jobber cannot reach the quantity, I will cite the formation of a certain trust some years ago. When this combination was formed, certain large and favored jobbers were put upon the Class A list; the list entitled the members thereof to the most favored prices of the manufacturers. All persons who were unfortunate enough not to be placed on that class were required to buy a large quantity at one time to prove their eligibility to become buyers belonging to the A Class, the B Class, the C Class, as the case may be.

They placed the quantity so high that jobbers who had not been included in the original list in many instances could not see their way clear to take the quantity the manufacturers required them to take at one time before they could get the favored price. The result was many of the smaller jobbers, including the writer's house, were compelled to buy from the larger jobbers, who offered a better price than the manufacturers upon the same class of goods.

The result of the system was that they said to any one who wanted to engage in the manufacture of this line, here are a numerous lot of first-class buyers who are ready to patronize you if you engage in the business. The first independent manufacturer who offered his wares had the immediate patronage of a large number

of jobbers who felt that they had not been properly treated by the trust, with the ultimate result, of course, of the absolute failure on the part of the trust company. That trust deserved to fail.

The Axe people, the Tack people and a number of other combinations of manufacturers failed the same way. "You can lead a horse to water, but you cannot make him drink."

Promoting the Manufacturers' Welfare.

The summary of all this is that the manufacturer should take into account his own interest, and should fix a price that will permit the small jobber, who is not favored with the patronage of a large population because of his location in a smaller trade center, with just as much profit on the goods he handles, as he grants to the larger jobber located in the larger trade centers. If a jobber, he should have jobber's prices; if he is a retailer, retailer's prices; if a manufacturer, he should be given manufacturer's prices.

But he should not be paid less for services rendered than the manufacturer pays to another and more favored and larger jobber. There is, of course, a difference between the carload and less than carload price, the manufacturer is justly entitled to what is to him the difference in the cost of handling C. L. and L. C. L. stuff, but beyond that additional cost, the small jobber should be granted the same price as the larger one.

Of course I know that the larger jobber and the offending manufacturers will take exception to this line of argument. On the other hand, I am quite sure that the many excellent smaller jobbers throughout the United States will agree that the position I take is not alone reasonable, but that it is absolutely fair as between manufacturer and jobber, and that it will pay the manufacturers to make such prices as will not alone keep the present smaller jobbers in their employ, by giving them fair wages for the services rendered, but that the success of the manufacturers will be enhanced and the certainty of getting fair pay for their manufactured wares will be safeguarded by increasing rather than diminishing the number of legitimate small jobbers handling their wares.

CENTRAL WEST.

Norwalk Lock Company's New Catalogue.

THE Norwalk Lock Company, South Norwalk, Conn., and 23 Warren street, New York, has just issued a fine catalogue of 571 pages, bound in heavy boards, illustrating and describing its complete lines of fine Builders' Hardware and Ship Hardware. There is an alphabetical index, numerical index and index to designs and descriptions of finishes to facilitate the immediate finding of articles. One page with explanatory drawings shows the handles of ordinary doors. Spaces are left for the insertion of lists or costs, but prices are printed separately, so that the illustrations and designs may be shown indiscriminately to customers from which to make selections. Sixty-four designs in Lock Sets alone are shown, together with an exhaustive line of the various kinds of goods known as Builders' and Ship Hardware.

Circular Letters in Invisible Ink.

A UNIQUE method of attracting attention has lately been used by the Norvell-Shapleigh Hardware Company, St. Louis, Mo. What is termed an "invisible letter" has been sent as a reminder of the St. Louis centennial week, October 3 to 9. This communication appears on a sheet which is blank except the heading, and upon applying a well dampened cloth or sponge, in accordance with directions given, the letter is brought out clearly and distinctly.

This is an idea which might perhaps be employed by retail Hardware merchants in connection with store advertising as the recipient's curiosity is excited and he or she is pretty sure to take the trouble to ascertain the contents of the communication.

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Manufacturers in Hardware and related lines are requested to send us copies of new catalogues, price-lists, &c., for notice in this column and for filing in our Catalogue Department.

FEARLESS DISH WASHER COMPANY, Rochester, N. Y.: Four-page illustrated folder of the Fearless Dish Washer, especially serviceable for hotels, colleges, schools and other large institutions.

HUGH ELMER CLARK & BROS., Rochester, N. Y.: Illustrated catalogue, 24 pages, of Clark's Emergency Exit Door Lock for theater, school, assembly hall, hotel and church entrance and exit doors.

CRESCENT COMPANY, 106 South Clinton street, Chicago, Ill.: Illustrated catalogue No. 10 of Electrical specialties.

BLACK SILK STOVE POLISH WORKS, Sterling, Ill.: Illustrated folder, reproducing a series of magazine and newspaper advertisements relating to Black Silk Stove Polish.

VOSSELLER, SEBRING & NORTHROP, 75 Warren street, New York, manufacturers' direct representatives in Hardware and Sporting Goods lines: Folder referring to articles produced by the Sun Mfg. Company, Weston & Wells Mfg. Company, Rochester Can Company, R. W. Robinson Company, G. M. Yost Mfg. Company, F. W. Loll Mfg. Company, Buckeye Aluminum Company, Standard Aluminum Company, Royal Polished Steel Roaster Company, Lion Chemical Company, Strock Mfg. Company, Harkins & Willis, George H. Bucheimer, Burlington Basket Company, Wilkes & Anderson and the Chicago Sportsmen's Supply Company.

C. S. BELL COMPANY, Hillsboro, Ohio: Catalogue No. 908, devoted to Steel Alloy, Church, School and Alarm Bells. The Bells are provided with improved springs, and Bells No. 36 and larger are rotated on roller bearings. These bearings result in easy ringing and uniformity in the stroke. The catalogue is attractively printed with numerous illustrations of famous churches and cathedrals.

CLIMAX LOCK & VENTILATOR COMPANY, 654-658 Michigan street, Buffalo, N. Y.: Catalogue No. 2 devoted to a line of Climax Mail Boxes, made in cold rolled steel, polished and unpolished, black sheet steel and solid brass metal. These goods are made in different styles.

LIGGETT SPRING & AXLE COMPANY, Pittsburgh, Pa.: Catalogue relating to Coach Scroll and Platform Springs; Also semi-elliptic Springs. Attention is called to the fact that in regular practice the company uses three grades of steel, as follows: Open Hearth Carbon, Crucible Carbon and Vanadium Alloy.

SMITH & WESSON, Springfield, Mass.: Catalogue of Revolvers for the pocket, for the military and for target practice. A number of pages are devoted to artistic illustrations of the development of small arms, showing the various styles in use in the years 1300, 1525, 1625, 1776, 1830 and 1865.

SPARGO WIRE CLOTH COMPANY, Roine, N. Y.: Catalogue relating to all kinds and all meshes of Brass, Copper and Bronze Wire Cloth; also Bronze and Galvanized Window Screen Cloth. Illustrations are given of different meshes and numbers of wire, also price lists of the various kinds of cloth manufactured by the company.

McKINNON DASH COMPANY, Buffalo, N. Y.: Catalogue No. 10, of nearly 100 large pages relating to Dashes and Fenders for carriages and automobiles, Roll Up Straps, Prop Block Washers and Shaft Leathers. A page is devoted to exterior views of the company's three plants in Buffalo, Troy, Ohio and St. Catharines, Ont. The catalogue is printed in two colors, and illustrates the various lines of goods in a variety of sizes and styles.



How an Employee Became an Employer.

Methods Followed in Restoring a Dying Business to Life and Vigor.

BY A. S. ATKINSON.

THE firm of Harding & Co., Hardware dealers, after 25 years of successful business operation, had reached a point where the sole surviving member of the concern was ready to quit and go out of the business. For five years trade had decreased and competition increased, until the inevitable consequence of such a condition of affairs was perilously near.

Old man Harding was the last of a race of Hardware merchants in Towersville, and he had hung on reluctantly for the sake of the name and reputation his ancestors had bequeathed to him. **He had three times diminished the size of the store, until now it occupied a little more than one-quarter of the original site.**

"I am glad I have no son to hand the old thing over to," he had growled more than once to himself. "That's one satisfaction."

Breaking the News.

But in his employ there was another who had worked up from office boy to a position of confidential clerk. Young Stanhope had in recent years shouldered most of the burdens of the firm and had won the confidence and trust of his employer. So when the time came to dissolve the firm Harding felt that the hardest part of his task was to notify Stanhope of the impending change.

"You've been a right hand man to me, Henry," he said by way of apology, "and I hate to turn you adrift. But I'm losing money and can't keep up the business. The Hardware trade has gone all to pieces in this town since the department stores took to handling most of our goods. They skim the cream of the trade and leave us the milk."

Henry Stanhope was not so visibly disappointed as the Hardware merchant had expected to find him. In fact, there was an eager, half expectant expression on his face.

An Effect Not Anticipated.

"Mr. Harding," he replied, slowly, "I have always tried to please you and follow your lead, and if I have differed from you in any policy I have always kept it to myself. You will therefore pardon me if I now say I do not agree with you. I do not think the Hardware business in this town is unpromising. On the contrary, I believe there is a great future for it."

The old man shook his head and smiled graciously. "We can't agree on that point, Henry, I am sorry to say."

There was a moment of silence. Then young Stanhope said, "I have saved up a little in the past 10 years, and have now nearly \$2,000, Mr. Harding, and I am willing to back my faith with all the money I have."

"What do you mean, Henry?"

"Simply this, Mr. Harding. If I can conduct this business according to my ideas I am willing to put my little capital in it. I will either buy you out or go in with you as a partner—provided I can manage it along my own lines."

"You want to be boss, eh, Henry?" smiled back the

old merchant. "A sort of reversal of conditions—you the employer and I the clerk?"

"Oh, no, Mr. Harding!" protested the younger man. "I didn't mean that. I should like to have you in the firm, but I would like to experiment along new and novel lines. If I buy you out it will exhaust most of my capital at the outset, and I need it to put my experiments into practice."

Fatherly Advice Extended.

Harding, who deep down in his heart hated to give up the business which his father had established, drummed slowly on the desk for a few moments, and then spoke quietly and in a fatherly voice:

"I don't want to give up the business, Henry, and yet I can't afford to run it. On the other hand, I can't let you put your savings into it without warning you of the danger. We have been going steadily behind now for several years, and your \$2000 will be swallowed up within two years. Then you will be without a position and without capital."

"Of course I have looked at that side of the question, too," replied Stanhope, "but every business means a certain amount of risk. If I started in business for myself in a new field I would have to face that danger. It would be a less risk here, where we have something to begin with. We have some old reliable customers—"

"Mighty few! Mighty few!" interrupted Harding, "and they're falling away every year."

"Then I will win them back. Give me a trial, Mr. Harding."

Stanhope to the Fore, Harding in the Background.

The result of this interview was that the sign of Harding & Co. was not taken down. Outsiders knew little of the internal change in the affairs of the concern. Mr. Harding agreed to retire to the background for one year and let young Stanhope take hold of the tottering fortunes of the house. He was to have full swing, with no veto power on the part of the old man. It was practically a reversal of conditions. Stanhope was the head and Mr. Harding an employee without any stated salary.

Henry Stanhope had imagination—constructive imagination—but to his former employer he seemed a good deal of a visionary. **Convinced that the business was suffering from dry rot and adherence to old methods, Stanhope felt that there was an opportunity to build up the business along more modern lines.**

Replenishing on a Large Scale.

In the first place there were the big department stores to compete with. Since their advent in Towersville they had slowly but surely absorbed much of the legitimate Hardware trade, until it was pretty poor pickings for the stores which clung tenaciously to their specialties.

On taking charge of affairs Henry Stanhope made a careful inventory of stock and found that their assortment of goods was poor and incomplete. When he set about replenishing the stock it was on such a large scale that Mr. Harding shook his head and exclaimed:

"Why, Henry, we won't sell all of that stuff for five years!"

"Not if we don't make the people buy it."

Putting Salt in the Water.

"You can't make people buy if they don't want to. You can lead a horse to the water, but you can't make him drink."

"I once saw a man do that," Henry replied with a smile, "by putting salt in the water. You see the horse was salt hungry. May be if we give our customers some salt they'll take our Hardware."

The meaning of this remark was not immediately grasped by Harding, but it began to dawn upon him slowly when matters developed. Along with the shipments of Hardware goods were several cases of novelties **which no Hardware store in Towersville had ever handled before.**

Fighting Fire with Fire.

For instance, there were several gross of talcum powder, a lot of perfumery, soap, bales of muslin, cheese-

cloth, and various similar materials usually found only in department or dry goods stores.

"What do you intend to do with those things?" asked Harding in surprise.

"That's the salt in the water," Henry replied. "I bought them direct from factories and mills at ridiculously low prices, and I intend to sell them at cost. I think I can beat the department stores on them. Mr. Harding, I'm going to fight fire with fire."

Circular Letters with Attractive Prices.

The next move was to go over the list of old customers, and to compile from the directory another list of names of people who had never traded at Harding & Co.'s place in the past. To each of these a circular letter was addressed, giving the prices of the novelties which were offered to customers, one-third to one-half less than those ruling in the department stores.

Counters and Cases Make Appeal.

Meanwhile, the interior of the store and show windows were dressed up in the most attractive manner. Articles were assorted and arranged on counters and on cases according to their prices. In one case were 5 and 10 cent articles, in another all things which sold for 20 and 25 cents, and so on up to articles which retailed for several dollars each. A customer entering the store would be greeted with the signs:

**ALL GOODS IN THIS CASE
FIVE AND TEN CENTS**

**YOUR CHOICE HERE FOR
A QUARTER OF A DOLLAR**

**TAKE WHAT YOU WANT HERE FOR
A \$1, AND WE WILL THROW
IN FREE ANY SINGLE NOVELTY
ON COUNTER 3**

County Fair Atmosphere.

An extensive use of colored paper and cloth added to the attraction of the windows and interior. The store looked more like a county fair than a dignified store of the old school. The circular letter brought a few of the old customers into the store, and nearly every one bought something in the Hardware line. The comment of more than one was something like this:

"Why, I didn't know you carried such an assortment of goods."

"That," remarked Stanhope to his partner, "must be the keynote to our success. Impress people by the assortment of our goods, and then make prices attractive."

Harding agreed that this looked practical, but it was hard for him to get accustomed to the dry goods notions on his counters. He had never handled such things before.

A Delivery Wagon That Sold Lots of Goods.

Stanhope advertised each day in the papers, calling attention to some new line of goods and their premiums for all purchases. Not satisfied with this, he secured a delivery wagon which he dressed up as never was delivery wagon dressed before. Outside of the canvas top a series of Hooks were arranged, and from these were hung a big assortment of light articles of everyday use.

**IF YOU FORGOT TO ORDER ANY
OF THESE THINGS
WHEN AT THE STORE
BUY THEM FROM THE WAGON**

was the legend inscribed over the top.

In delivering orders, the driver thus frequently sold several dollars' worth of Tin and Iron Ware direct from the wagon. Nine people out ten forget something, and the sight of a big assortment of goods dangling temptingly before the eyes induces purchases. In this way the delivery wagon more than paid for itself.

Business Picked Up Rapidly.

After the first month trade picked up rapidly. Many came to take advantage of the premiums. Housewives, the shrewd shoppers of to-day, found they could get soaps, muslin, cheesecloth, cotton batting and such articles cheaper at Harding & Co. than at the department stores. The latter sold these goods at a fair profit; Harding & Co. sold them at no profit. They relied upon their Hardware for their profits. **Stanhope reasoned that the first step toward success was to fill his store with customers and seekers for bargains. Then the rest depended upon his goods, prices and assortment.**

Stirring Up the Farmers.

His next move was to go for the trade of the farmers and people from the suburbs. He offered to pay the equivalent of carfare one way for every purchase amounting to \$5. He distributed free samples of Fertilizers with prizes for those who raised the greatest quantity of stuff on a given area of ground. Packages of seeds were sold with \$1 bill placed in one package of each week's supply, and the lucky winner's name was always published in the papers.

To make good on this end he laid in a complete set of farmers' tools and supplies, from Cream Separators and Churns to Shovels and Rakes. **No farmer could ask for a thing without finding it in stock.**

Store Enlarged and Departmentized.

Within a year the store was enlarged, and then came the process of dividing it up into departments. There was a household department, a farmers' department, a builders' department, an automobile supply department, a general department and the bargain department. **A person entering the store knew immediately where to look for the goods he was seeking. This simplified matters and reduced the number of clerks needed.**

Expenses Met and Profit in Sight.

The first year they just covered expenses, for their outlay had been extremely large, but the number of customers who visited the store each day had been increased by 500 per cent. and the gross sales by nearly 700 per cent.

"Next year we'll make a substantial profit," young Stanhope said hopefully when they examined their accounts. "We have things systematized now, and our expenses can be materially reduced."

"I believe you, my boy, I believe you," was Harding's reply. "You have demonstrated to me the value of new and progressive ways. I didn't have the courage to try it myself. I guess we'll continue as before—you the employer and I the employee."

"No, not that," magnanimously answered Stanhope, "but as equal partners. I think we can work in harness together now."

And they did much to the satisfaction of both.

THE BYRD HARDWARE COMPANY, a corporation which has just been organized under the laws of Alabama with a capital of \$25,000, has taken over the business formerly carried on by Byrd & Dowling, Ozark, Ala. The incorporators are A. B. Byrd, Marvin Dowling and R. V. Chalker. There will be no change in the policy of the business.

WILLIAM E. SHEDD of the Yeomans & Shedd Hardware Company, Danville, Ill., died on the 19th ult., after a long and trying illness. Mr. Shedd was one of the founders of the business 34 years ago and his sterling worth and ability helped materially to build up the trade of the house to its present proportions.

Russell & Erwin Mfg. Company's New Catalogue.

THE Russell & Erwin Mfg. Company, New Britain, Conn., has just issued a new general catalogue, Volume X, accompanied by separate price-lists in which only are list prices printed. The catalogue illustrates and describes the extensive line of Builders' and Shelf Hardware manufactured by the company. In its preparation the utmost care has been given to every detail. The binding is of the loose leaf type and on the outside cover is displayed in large letters the trademark name "Russwin." The half-tones and wood engravings, of which there are more than 5500, are printed on high grade paper. The book is from the press of the American Bank Note Company. There are 44 pages of index, in addition to its 1017 pages of regular catalogue matter. A page illustrates the plant in 1849, on the reverse side of which is shown the present factories.

Three complete indexes, namely, alphabetical, design and numerical, are supplied. A colored plate shows the original and distinctive style of labeling the products. It is obvious that the use of these labels makes it easy to determine at a glance the class and location of the goods, and the simple massing of solid colors gives a pleasing decorative appearance to the shelves.

There are 164 designs, subdivided and arranged under the several styles of architecture. The divisions are so arranged that the designs of each school are in reality a separate book, which can be so distributed. These divisions are designated by a tinted page, on which is given brief and accurate information as to the origin of each school of architecture. Each design embodies all the parts necessary to complete and harmoniously equip any building throughout, which treatment is now so universally demanded by modern architecture.

Locks and Latches occupy nearly 200 pages, making an exceptionally large and comprehensive line. This section is also subdivided by tinted pages. Each of these divisions open with pages giving technical and interesting information regarding the uses of the numerous classes of Locks. The line of Unit Locks, Front and Vestibule Door Locks, Office Door Locks, Hotel Locks, Car Locks, Ship Locks, Asylum Locks, Mortise and Rim Locks for every conceivable use are very thoroughly illustrated and described.

In line with the vast amount of detail which is given one of the most noticeable features is that cuts have been introduced to show the goods as they are intended to be used. Locks are shown applied to doors; Door Checks, Cremorne Bolts, Store Door Handles, Casement Adjusters, Transom Lifters, as well as many other articles, are illustrated as if in actual use. Co-operation with the dealer, architect and builder has been the ruling motive in constructing the book, so that as a whole, or in part, it may facilitate their business.

The price-list is said to be the first of the loose-leaf type to be used by any of the manufacturers of Builders' Hardware. It contains 384 pages, which have been divided into two sections. In the first section all design goods are arranged in alphabetical order. Miscellaneous goods follow in alphabetical order. This arrangement makes it easy to locate any article without first referring to the catalogue.

The use of the loose-leaf devices will greatly facilitate the trades keeping their catalogue and price-list up to date, as new pages will always be sent out whenever changes or additions require it. The catalogue is a fine example of trade literature, thoroughly modern and reflects great credit on its compiler.

NORVAL RICHARDSON, Vicksburg, Miss., who has been connected with Lee Richardson & Co., the well-known Hardware house of that city, has just been appointed to a position in the United States diplomatic service at Havana, Cuba. Mr. Richardson was one of a few appointed after severe competition, the requirements of the service being more exacting than formerly. This position is considered one of importance, calling for the exercise of especial tact and talent, and the selection of a Southern man for the position is gratifying to that section of the country.

Probing the Express Companies.

Investigation by the Merchants' Association of New York City—Arguments Before the Public Service Commission—Public Hearing Determined Upon.

THE Hardware trade in all parts of the country, as well as merchants and manufacturers in other lines, are interested in the investigation inaugurated early in the year of the practices and regulations of the express companies doing business in the State of New York. It is gratifying to report that these efforts are beginning to show progress and to accomplish results. It will be recalled, as narrated in our columns at that time, that last spring the Merchants' Association of New York City took the matter under advisement as the representative of a great body of merchants making extensive use of express facilities. This action led the association to accumulate considerable data from responsible sources all over the State, largely from chambers of commerce, boards of trade and prominent merchants, who submitted documents in definite form for submission to the Public Service Commissioners, Second District, with headquarters at Albany.

There were several postponements during the vacation period, but on September 16 a hearing was granted, at which John W. Griggs, former United States Attorney-General, representing the Merchants' Association, contended that on the information placed before the commission there was reasonable ground for an investigation into the management and operation of express companies.

The Indictment.

The specifications made by the association were disregard of specified ruling, delays in delivery, failure to notify shippers of nondelivery, delay in returning undelivered goods, delay in settlement of claims, unreasonable restrictions of free delivery limits, unreasonable requirements as to methods of packing, delay in accounting for collections, overweight and complaint as to rates generally.

Synopsis of Mr. Griggs' Argument.

Mr. Griggs said, in part, that in his opinion the commission was a constantly convened body, appointed to regulate such matters as were set forth in the complaint and to make orders where it had the authority and where no authority was found to ask the Legislature for full authority when it believed corrective regulation should be applied. He said that the express companies occupied a peculiar position among common carriers. While in Europe this work was performed entirely by the railroads themselves, in this country there is double expense of organization and the necessary double dividends for transportation over railroads by reason of the existing express companies.

The contention of the express companies has been that the Merchants' Association had no standing in the matter as it was not a shipper. To this the association answered that it was the privilege of any one to present facts concerning conditions to a properly constituted tribunal created to take cognizance of irregularities in such fields, and that the work was too vast for individuals to be expected to undertake the collection of adequate material to make out a case of such importance. In its opinion it was irrelevant through what channels the information reached the commission; the question being whether the charges were true and buttressed with proof.

Express Companies' Point of View.

T. B. Harrison, Jr., representing the American, Adams, National, and Canadian Express companies, said

that his clients did not object to an investigation of specific matters, but protested against an investigation of the dragnet character. He argued that if the Merchants' Association's request was granted it would mean the wiping out of the present rate schedules, rules and regulations in existence by express companies, and the making of such rules, regulations and schedules by the commission.

C. W. Stockton, for the Wells-Fargo Express Company, argued that there was no possible reason for such an investigation, and that 90 per cent. of all the business done by the express companies of the State, excepting the American, is interstate business. He resented what he said was usurpation on the part of the Merchants' Association, which had set itself up as a tribunal to receive complaints.

Position Taken by the Commission.

In answer to this he was assured by the commission that so far as the question of rates was concerned the complaint of the Merchants' Association would not warrant the making of an order on the question of rates, inasmuch as the statute requires that an order shall be made only after a hearing upon complaint of a person or corporation aggrieved, but that under its general powers and in view of the fact that the attention of the commission was called by so important a body as the Merchants' Association, it could proceed to an investigation of the practices, rules and regulations of the companies, and it believed that the companies, against which there is an unmistakable feeling of hostility among a large number of people, should welcome an investigation, which, if it resulted in their favor, would give them peace for some years to come on the particular matters on which complaint is now made.

Public Hearing on October 18.

After Mr. Griggs stated that he would place the volume of facts and figures, collected by the Merchants' Association, before the commission and would produce witnesses to show that a full investigation by the commission is warranted, the commission announced that it would hold a public hearing at the assembly room of the Merchants' Association, 66 Lafayette street, New York, on Monday, October 18, at 10 a.m., at which time it would listen to testimony which the Merchants' Association desired to produce in support of its application for an investigation.

The Atlantic City Conventions.

A NNOUNCEMENT is made that Dr. Frederick A. Cook, the discoverer of the North Pole, will be a special guest at the annual banquet on Thursday night, 14th inst., which will be the principal social feature of the joint conventions of the American Hardware Manufacturers' Association and the National Hardware Association at Atlantic City next week. The price of tickets for this banquet will be \$7 for each participant, lady or gentleman, and requests for tickets should be addressed to E. C. Griswold, Corbin Cabinet Lock Company, Sixth and Arch streets, Philadelphia, who will have charge of the seating arrangements for the dinner. As it is expected that the demand for dinner tickets will exceed the seating capacity of the banquet hall, seats will be assigned in the order in which requests, accompanied by checks, are received by Mr. Griswold.

The Parry Mfg. Company's Vehicle Catalogue.

The Parry Mfg. Company, Indianapolis, Ind., has just issued its 1910 catalogue of vehicles, printed in three colors, and containing 112 large pages of illustrations and descriptions of the goods. The first page is devoted to an engraving of the company's factory. The line covers surreys, phaetons, buggies, stanhopcs, drivers,

runabouts, concords, wagons, buckboards, delivery wagons, carts, &c. These are all shown in a variety of styles and are all guaranteed to withstand the wear of fair and reasonable use, as private vehicles, for one year from date of purchase.

The Tip-Top Folding Card Table.

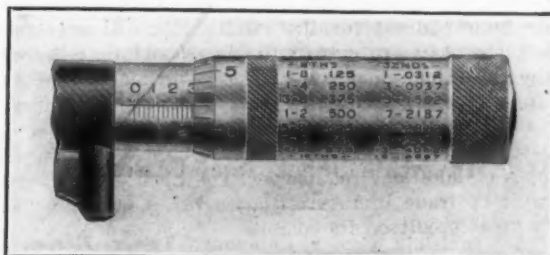
The F. E. Kohler Company, Canton, Ohio, is putting on the market a folding card table, with top that tips in a perpendicular position when the legs are folded together. The point is made that the construction of the table is such as entirely to overcome the annoying feature of pulling out the legs, these opening automatically when the top is tipped in a horizontal position. The table stands erect when folded. The top of the table measures 30 x 30 in., and is covered with leatherette or felt. The covering can be readily renewed by removing a single part held in place by screws, so that it may be always kept looking like new.

"Very Best" Steel Letters and Figures.

Wiebusch & Hilger, Ltd., 106-110 Lafayette street, New York, have been appointed sole agents for the line of "Very Best" steel letters and figures, manufactured by the New York Stencil Works, 100 Nassau Street, New York. The goods are made in a full range of sizes from 1-32 to 1/2 in. high, and are deeply and accurately cut on special steel. Each letter or figure is centered on the piece upon which it is cut, and all are perfectly aligned. These features are important when a number of pieces are used in combination with each other. The entire line has been specially designed to meet the requirements of machine shops and manufacturers needing steel letters and figures for use on hard metals. The production of parts in many factories that later must be assembled necessitate designating marks that are clear and legible. This line is particularly adapted for use by automobile manufacturers for this purpose, and special attention has been given to the hardening and tempering of each piece in such a way as to give adequate service under the most exacting conditions. The opinion is expressed that the trade will find it an attractive line to market, both as regards profit and the satisfaction of furnishing goods fully guaranteed by the manufacturer. The goods are put up in handsome wood boxes, stained and varnished, attractively labeled in red for the letters and in blue for the figures with the sizes clearly shown, which enable stock clerks and users speedily to determine the contents.

The Slocomb Micrometer Head with Table of Decimal Equivalents.

A micrometer head with decimal equivalents has been put on the market by the J. T. Slocomb Company, Providence, R. I. The table enumerates 4ths, 8ths, 16ths



The Slocomb Micrometer Head with Table of Decimal Equivalents.

and 32ds, which with the company's name and address extends around the thimble. The lettering is rolled on all thimbles which enables the maker to provide similar tables on all sizes of micrometers made up to 24 in. Another advantage is that the large number of figures and letters amount practically to a knurl the whole length of the thimble.

Steel King Ball-Bearing Washing Machine.

The Hiawatha Mfg. Company, Hiawatha, Kan., is manufacturing the Steel King ball bearing washer. The tube is made of good quality heavy steel, is well balanced, and there is ample room to get at the interior.



Fig. 1.—Steel King Ball Bearing Washing Machine.

Fig. 2 shows the machine nested for compactness and shipping, the raised cover illustrating the peculiar suction agitator by the movement of which soil and dirt are drawn from the fabric in washing; this part being easily removed if necessary by the loosening of a single nut and



Fig. 2.—Machine Compactly Nested, Showing Vacuum Agitator Under the Cover.

pin. It is claimed for the tub that it will not crack, swell, shrink, warp or fall to pieces, and that it needs no water in it when not in use. The machine weighs 25 lb.

Invisible Sheet Steel Castors.

The Invisible Castor Company, Tower House, 40 Trinity square, London, E. C., England, for which H. W. Peabody & Co., 17 State street, New York, are selling agents for the United States, is marketing the patented Invisible casters, or "domes of silence," as they are termed. They are made in three diameters—11-16, 7/8 and 15-16 in.—for chair legs or other furniture supports, so that the chair, sofa, cabinet, wardrobe, &c., will glide easily and noiselessly

Invisible Polished Steel Castors or "Domes of Silence."

over hardwood floors, linoleum, mosaic work, carpets,

&c., without marring the surface. They are stamped from sheet steel, are highly polished and have three wedge shape points 1/4 in. long for driving with a tap of the hammer into the bottom of chair or other wood furniture legs. A feature of the goods is the low cost, ease of application, invisibility and simplicity.

Removable Steel Clothes Post With Adjustable Steel Hook.

The Milwaukee Steel Post Company, Milwaukee, Wis., has brought out a removable steel clothes post designed to take the place of the old-fashioned wooden



Removable Steel Clothes Post with Adjustable Steel Hook Which Obviates the Necessity of Props.

clothes posts and poles, which present an unsightly appearance in yards and lawns. The post and the socket base in which it is held are separable. The latter is 2 1/2 ft. long and is driven flush with the ground, a driving cap being provided for this purpose. When in position the post is inserted and can be lifted out again, leaving the lawn free of obstruction to the lawn mower or other uses. The posts are made of special high carbon steel tubing, 15-16 in. in diameter, with a height of 6 1/2 ft. above the ground.

Strength and stiffness are imparted by being filled with concrete, which, it is stated, enables them to bear without permanent bending more than 150 lb. of clothes or carpets. For the support of greater weights a heavier post of 1 1/2-in. tubing is supplied, but it is only required to sustain unusual weights, such as are imposed by the suspension of hammocks. The convenience of the steel pole has been enhanced by a steel hook automatically adjusted by the tightening of the clothes line at any height desired. By this means clothes may be hung on the line at about 4 1/2 ft. from the ground, after which the hook is easily pushed to the top of the post, where it remains firm until pulled down for convenience in removing the clothes.

Electric Portable Lamp.

The Crescent Company, with sales office at 106 South Clinton street, Chicago, and factory at Valparaiso, Ind., is putting on the market a new portable lamp for factory and warehouse use, the style of which is shown in the accompanying illustration. The guard is constructed of copper plated steel wires attached to a handle, in which it is securely imbedded. The handle is perforated to receive cord of any size and will hold either a 16 or 32 cp. lamp. Guards with either key or keyless sockets are furnished by the company.



Electric Portable Lamp for Factory and Warehouse Use.

The J. H. Collier Hardware Company, Newton, Miss., has been incorporated with a capital stock of \$10,000 to carry on a wholesale and retail business in Shelf and Heavy Hardware, Stoves, Tinware, Window Glass, Paints, Oils, Sporting Goods, Building Material, Lime and Cement.

The Shroeder Ratchet Spanner.

The Shroeder ratchet spanner wrench has been brought out by the Roren Drop Forging Company, Providence, R. I., for motorists, engineers, shipbuilders, shops,

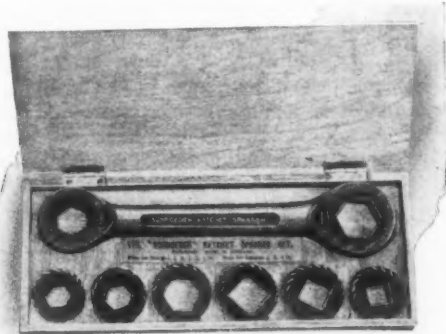


Fig. 1.—Shroeder Ratchet Spanner, No. 1 Set.

&c. It consists of a case hardened drop forged steel frame with a socket at each end recessed to take an easy catching ratchet. The disks, fitted for standard bolts and nuts up to $\frac{1}{2}$ in., fit the socket, the change from one size to another being accomplished by pushing the pawl downward with the thumb. The disks are cut with

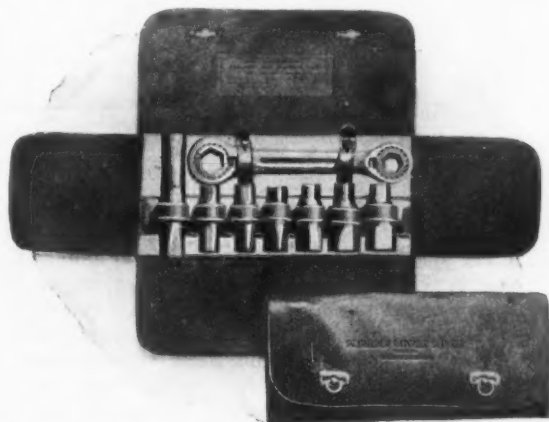


Fig. 2.—No. 2 Set, Same as No. 1, in Leather Wallet for the Pocket.

ratchet teeth on their circumference, engaging with the pawl which while in use rests against a step, holding it solidly in position when pressure is applied. The pawl not only acts to engage the ratchet, but is fitted with a guide which rides in a peripheral slot in the disk, preventing it from falling out. The spanner is furnished in four sets. No. 1 (Fig. 1) is fitted with disks for $\frac{3}{8}$ and $\frac{1}{2}$ in., and has extra disks for hexagon $\frac{1}{4}$, 5-16 and 7-16, and for square sizes $\frac{1}{4}$, 5-16 and $\frac{3}{8}$, fitted into an oak box, corner keyed for strength. No. 2 (Fig. 2) is the same as No.

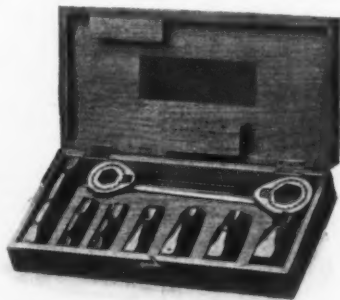


Fig. 3.—No. 3 Set, in Solid Polished Oak Box.

1, but is arranged in a leather wallet for pocket carrying. Set 3 (Fig. 3) consists of a spanner fitted with interchangeable disks for hexagon nuts $\frac{3}{8}$ and $\frac{1}{2}$. There is one each of box spanner $2\frac{1}{2}$ in. long to fit in the $\frac{3}{8}$ in. disk of spanner and to fit U. S. Standard nuts of the

sizes $\frac{1}{4}$, 5-16, $\frac{3}{8}$, 7-16 and $\frac{1}{2}$. There is also one adapter or extension pin $4\frac{1}{2}$ in. long, one end fitting the $\frac{1}{2}$ in. disk and the other end taking any of the box spanners of the set. The box is of oak. Set No. 4 is the same as No. 3, but is carried in a leather wallet.

The Woods-Sherwood Company's New Lustral Goods.

The accompanying illustrations represent new articles recently put on the market by the Woods-Sherwood Company, Lowell, Mass. In Fig. 1 is shown the **Royal Silver**

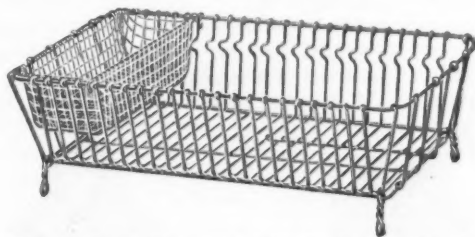


Fig. 1.—Royal Silver and Dish Drainer Combined.

and Dish Drainer, about the same size as the regulation drainer, but having a silver or small dish attachment which enlarges its range of usefulness. The projecting loops on the side are for retaining plates, saucers, &c.,

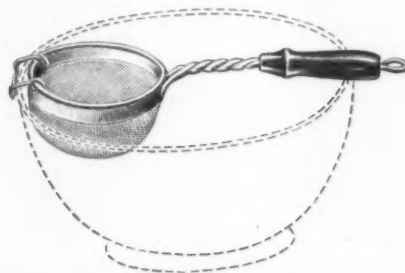


Fig. 2.—Lock Lip Strainer, Which Locks Itself on a Bowl or Other Receptacle.

in an upright position for rinsing. The small basket may be detached at will. As implied by its name, the **Lock Lip Strainer**, Fig. 2, is constructed so that when placed upon a bowl or other receptacle, it becomes locked in position and cannot slip without being lifted. The retain-



Fig. 3.—Whipit Egg Beater, Vegetable Skimmer, Egg Separator, &c.

ing lip can be folded flush with the strainer for packing purposes. A feature of the strainer is a rosewood finished handle, giving it an attractive appearance. The **Whipit Egg Beater**, Fig. 3, measures $10\frac{1}{2}$ in. over all,

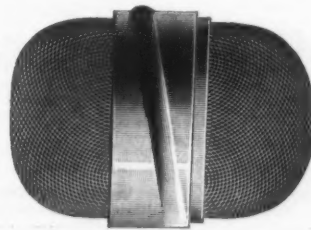


Fig. 4.—Screw Rim Tea or Coffee Ball, Obviating the Use of Strainer.

and consists of a spiral wire having its ends twisted and terminating in a nicely finished handle. The spiral is spoon shaped, which makes the article adaptable as a vegetable skimmer, egg separator, cake mixer, and for other similar uses. The **Screw Rim Tea or Coffee Ball**,

Current Hardware Prices.

General Goods.—Goods which are made by more than one manufacturer are printed in *Italics*. The prices named represent those obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices, while lower prices are usually given to larger buyers.

Special Goods.—Quotations printed in small type (Roman) relate to goods of particular manufacturers, who request the publication of the prices named and are responsible for their correctness. They usually represent the prices to the small trade, lower prices being generally obtainable by the fair retail trade, from manufacturers or jobbers.

Range of Prices.—A range of prices is indicated by means of the symbol @. Thus 33½ @ 33½ & 10% signifies that the price of the goods in question ranges from 33½ per cent. discount to 33½ and 10 per cent. discount.

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also **THE IRON AGE DIRECTORY**, issued annually, a book of 376 pages, which is sent free of charge to every subscriber to *The Iron Age*. It gives a classified list of the products of our advertisers and thus serves as an up-to-date **DIRECTORY** of the Iron, Hardware and Machinery trades.

Standard Lists.—"The Iron Age Standard Hardware Lists," 218 pages, price \$2, prepaid, contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Adjusters, Blind—

North's10%
Upson's Patent.....25%
Zimmerman's—See Fasteners, Blind.

Window Stop—

Ives' Patent.....25%
Ives' Stop Bead Screws and Washers.....25%
Taplin's Perfection.....25%

Anti-Rattlers—

Fernald Mfg. Co. Burton Anti-Rattlers, ½ doz. pairs, Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000

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Trenton@ 9%

Imported—

Swedish Solid Steel Paragon, ½ doz. pairs, Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000

Anvil, Vice and Drill—

Millers Falls Co., \$18.00.....15&10%

Augers and Bits—

Com. Double Spur.....80%
Jennings' Patn., Bright.....65&10%
Black Lip or Blue.....65&10%
Boring Mach. Augers.....70%
Car Bits, 12-in. twist.....40&10%
Ford's Auger and Car Bits.....40&5%
Ft. Washington Auger Co.....35%
Forstner Pat. Auger Bits.....25%
C. E. Jennings & Co.:
No. 10 ext. lip, R. Jennings' list.....25&7%
No. 30, R. Jennings' list.....50%
Russell Jennings.....25&13&2%
Mayhew's Countersink Bits.....45%
Pugh's Black.....20%
Pugh's Jennings' Pattern.....35%
Snell's Auger Bits.....60&10%
Snell's Bell Hangers' Bits.....60%
Snell's Car Bits, 12-in. twist.....60%
Snell's King Auger Bits.....50%
Snell's Star Auger Bits.....50&10%
Swan's Auger Bits.....65&10%
Swan's, Jennings' Pattern.....50%

Bit Stock Drills—

See Drills, Twist.

Expansive Bits—

Ford's, Clark's Pattern.....66%
C. E. Jennings & Co., Steer's Pat.....25%
Lavigne Pat., small size, \$18.00; large size, \$26.00.....60&10%
Swan's60%

Gimlet Bits—

Common Dbl. Cut.....Per gro. \$3.00@4.25
German Pattern, Nos. 1 to 10, \$4.75; 11 to 13, \$5.25

Hollow Augers—

Bonney Pat., per doz., \$5.50@6.00
Ames20&10%
Universal20%

Ship Augers and Bits—

Ship Augers.....40&10@50%
Ford's33&5%
C. E. Jennings & Co.:
L'Hommedieu's6%
Watrous'33&5%
Snell's50%

Awls—

Elmore Tool Mfg. Co.:
Tinner's and Brad Awls.....55&7%
Scratch Awls.....60%

Corrugated—

Acme Corrugated Fasteners.....70%

Faucets—

Cork Lined.....50¢10¢10¢60%

Metallic Key, Leather Lined.....60¢10¢10¢70%

Red Cedar.....40¢5¢10¢10¢5¢

Petroleum.....70¢10¢10¢75%

John Sommer's Peerless Tin Key.....40%

John Sommer's Boss Tin Key.....50%

John Sommer's Victor Mtl. Key.....50¢10%

John Sommer's Duplex Metal Key.....60%

John Sommer's Diamond Lock.....50%

John Sommer's I.X.L. Cork Lined.....50%

John Sommer's Reliable Cork Lined.....50%

Self Measuring:

Enterprise, Self Measuring and Pump, 3/4 doz., \$36.00.....40¢10%

Lane's, 3/4 doz., \$36.00.....40¢10%

Files— Domestic—

Best Brands.....70¢10¢10¢75¢10%

Standard Brands.....75¢10¢10¢80%

Lower Grade.....75¢10¢10¢80¢10%

Disston's Superfine.....60%

Fitchburg.....80%

Heller Bros.....70¢10¢10¢75¢10%

Liveright Bros., Gold Metal.....70%

McCaffrey's American.....60¢10¢10%

McCaffrey's Swiss Pattern.....45¢10%

Simonds.....70%

Fixtures, Fire Door—

Richards Mfg. Co.:

Universal, No. 103; Special, No. 104.....\$3.75

Fusible Links, No. 96.....50%

Expansion Bolts, No. 107.....60¢10%

Grindstone—

Net Prices:

Inch.....15 17 19 21

Per doz.....\$3.00 3.25 3.55 4.00

Peck, Stow & Wilcox Co.:

In.....15 17 19 21 24

\$1.00 1.40 1.75 5.50 6.50.....20%

Reading Hardware Co.....50¢10%

Frames— Wood Saw—

White, S'g't Bar, per doz.....\$1.00

Red, S'g't Bar, per doz.....\$1.00 to \$1.25

Red, Dbl. Brace, per doz.....\$1.40 to \$1.50

Freezers, Ice Cream—

Qt.....1 2 3 4 6

Each.....\$1.25 \$1.60 \$1.90 \$2.20 \$2.50

Fuse— Per 1000 Feet.

Hemp.....\$2.75

Cotton.....3.20

Waterproof Sol. Taped.....3.65

Waterproof Dbl. Taped.....4.40

Waterproof Tpl. Taped.....5.15

Gates, Molasses and Oil—

Stebbins' Pattern.....80¢10¢10%

Gauges—

Marking, Mortise, &c., 50¢50¢10%

Chapin-Stephens Co.:

Marking, Mortise, &c., 50¢50¢10%

Disston's Marking, Mortise, &c., 60¢10%

Wire, Brown & Sharpe's.....35%

Wire, Morse's.....25%

Wire, P. S. & W. Co.....25%

Gimlets— Single Cut—

Numbered assortments, per gro.

Nail, Metal, No. 1, \$2.00; 2, \$2.30

Spike, Metal, No. 1, \$1.00; 2, \$1.30

Nail, Wood Handled, No. 1, \$2.50; 2, \$2.60

Spike, Wood Handled, No. 1, \$1.30; 2, \$1.60

Glasses, Level—

Chapin-Stephens Co.....65¢10¢10%

Disston & Sons.....60¢10%

Glue, Liquid Fish—

Bottles or Cans, with Brush, 25¢10¢50%

Grease, Axle—

Common Grade.....gro. \$6.00 to \$6.50

Dixon's Everlasting, 10-lb. pails, ea. 85¢; in boxes, 3/4 doz., 1 lb., \$1.20; 2 lb., \$2.00

Helmet Hard Oil.....25%

Griddles, Soapstone—

Pike Mfg. Co.....33 1/3% to 33 1/3% 10%

Grinders—

Pike Mfg. Co.:

Hand and Foot Power, Pyko Nos. 1, 2, 3; Pyko Primo; Pyko Peerless; Pyko Spiral (foot power).....33 1/3%

Mower Knife and Tool, \$5.00, 40¢10%

Royal Mfg. Co.:

Hand Power, each, Nos. 01, \$1.75; 02, \$2.25; 1A, \$2.50; 1B, \$3.25.....33 1/3%

Foot Power, No. 10, \$5.00.....33 1/3%

Encased Gears, No. 15, Hand Power, \$15.50; Combined Hand and Foot Power, \$15.00.....33 1/3%

Lawn Mower Grinder, No. 40, \$3.75.....33 1/3%

Sickle Grinder, each, No. 20, \$5.00.....33 1/3%

Cast or Cut Gears.....33 1/3%

Grindstones—**Pike Mfg. Co.:**

Improved Family Grindstones, 3/4 inch, 3/4 doz., \$2.00.....33 1/3%

Richards Mfg. Co., Eli and Cycle, Ball Bearing, mounted.....40%

Grips, Nipple—

Perfect Nipple Grips.....40¢10¢2%

Halters and Ties—

Cow Ties.....70¢10¢10%

Bridgeport Chain Co.:

Triumph Coil and Halters, 35¢2 1/2¢40%

Brown Coil and Halters.....150¢50%

Brown Cow Ties.....50¢50¢50¢10¢5%

Brown Tie Outs.....70¢10¢75%

Covert Mfg. Co.:

Web.....30¢10%

Jute Rope.....55%

Sisal Rope.....45%

Cotton Rope.....55%

Hemp Rope.....45%

Oneda Community:

Am. Coil and Halters.....40¢40¢5%

Am. Cow Ties.....450¢50%

Niagara Coil and Halters.....150¢50%

Niagara Cow Ties.....45¢50¢50¢10¢5%

Hammers—**Handled Hammers—**

Heller's Machinists'.....65¢10¢65¢10¢10%

Heller's Farmers'.....40¢40¢10%

Peck, Stow & Wilcox Co.:

Crucible Steel.....50%

Farmers'.....50%

Riveting.....50%

Machinists'.....50%

Blacksmiths'.....50%

Elmore Shoemakers' Hammers.....75%

Victor Magnetic Tack, 3/4 gro.....\$7.75

Heavy Hammers and Sledges—

Under 3 lb., per lb., 50¢.....80¢10%

3 to 5 lb., per lb., 40¢.....80¢10¢10%

Over 5 lb., per lb., 30¢.....80¢10¢10%

Handles—**Agricultural Tool Handles**

Axe, Pick, &c., 60¢10¢60¢10¢5%

Hoe, Rake, &c., 40%

Fork, Shovel, Spade, &c., 40%

Long Handles.....40%

D Handles.....40%

Cross-Cut Saw Handles—

Atkins'.....35%

Disston's Handles and Saw Tabs.....45%

Mechanics' Tool Handles—

Auger, assorted.....gro. \$3.00 to \$3.50

Bradawl.....gro. \$1.65 to \$1.75

Chisel Handles, Ass'd, per gro.:

Tanged Firmer, Apple, \$2.40 to \$2.65; Hickory.....\$2.15 to \$2.40

Socket Firming, Apple, \$1.75 to \$1.95; Hickory.....\$1.60 to \$1.75

Socket Framing, Hickory, \$1.60 to \$1.75

File, assorted.....gro. \$1.30 to \$1.40

Hammer, Hatchet, &c., 60¢10¢60¢10¢5%

Hand Saw, Varished, doz., 80¢; Not Varished.....70¢10¢75%

Plane Handles:

Jack, doz., 2¢; Fore, doz., 4¢

Chapin-Stephens Co.:

Carving Tool.....30¢30¢10%

Chisel.....60¢60¢10%

File and Awl.....60¢60¢10%

Saw and Plane.....30¢30¢10%

Screw Driver.....30¢30¢10%

Millers Falls Adj. and Ratchet Auger Handles.....15¢10%

Nicholson Simplicity File Handle.....3/4 gro. \$0.85 to \$1.50

J. L. Osgood:

Indestructible File and Tool, 3/4 gro., No. 1, \$2.00; No. 2, \$2.50; No. 3, \$3.00; No. 4, \$3.50; No. 5, \$4.00.....gro. lots 10%

W. A. Zelnicker Supply Co.:

Hammer, 3/4 doz., 12 in., \$2.00; 14 in., \$2.00; 16 in., \$2.30; 18 in., \$2.50; 20 in., \$2.70; 22 in., \$3.00; 24 in., \$3.30; 26 in., \$3.50; 30 in., \$3.80

Sledge, 3/4 doz., oval, 30 in., \$3.80; octagon, 30 in., \$3.80; oval, 36 in., \$4.00; octagon, 36 in., \$4.00

Axe, 3/4 doz., 28 to 31 in., \$5.00; 36 in., \$5.80

Adze, 3/4 doz., 36 in., \$5.80; 36 in., \$7.80

Pick, 3/4 doz., R. R., 36 in., \$8.00; coal, 34 in., \$5.80

Hatchet, 3/4 doz., 12 to 14 in., \$2.00

Hangers—**NOTE—Barn Door Hangers are generally quoted per pair, without track and Parlor Door Hangers per double set with track, &c.**

Chicago Spring Butt Co.:

Friction.....25%

Oscillating.....25%

Big Twin.....25%

Chisholm & Moore Mfg. Co.:

Baggage Car Door.....50%

Elevator.....30%

Railroad.....50%

Crank & Carrier Mfg. Co.:

Loose Axle.....60¢10%

Roller Bearing.....70%

Griffin Mfg. Co.:

Solid Axle, No. 10, \$12.00, 60¢10%

Roller Bearing, No. 11, \$15.00, 60¢10%

Roller Bearing, Ex. Hy., No. 22, \$18.00, 60¢10%

Bull Dog, \$24.00, 60¢10%

Lane Bros. Co.:

Parlor, Ball Bearing, \$4.00; Standard, \$3.15; No. 105, \$2.85; New Model, \$2.80; New Champion per set of 4 Hangers, complete with track.....\$2.25

Barn Door, Standard.....60¢10%

Hinged.....net \$6.08

Covered.....60¢5%

Special.....70¢5%

Trolley Hangers and track.....50%

Lawrence Bros.:

Clipper, No. 75.....60%

Crown.....55¢10%

Cyclone, No. 40.....net \$6.50

Tandem, No. 50.....net \$7.50

New York.....55¢10%

Trolley, No. 30, 3/4 pair.....\$1.25

McIntire Mfg. Co.:

Roller Bearing, Nos. 1 and 2, 70%

Anti-Friction.....60%

Hinged Hangers, King Charm.....60%

F. E. Myers & Bro., Stayon;

O. K.; O. K. Adjustable; Sure Grip; Sure Grip Adjustable; Sure Grip Tandem; Sure Grip Tandem Adjustable; Tandem Adjustable.....60%

Richards Mfg. Co.:

Hangers, Nos. 47, 48, 147, 217, 60¢5%

Pioneer Wood Track, No. 3, \$2.25

Roller B'g St'l Track No. 12, \$2.20

Roller B'g St'l Track No. 13, \$2.50

Roller B'g, Nos. 39, 41, 43, 70¢7 1/2%

Hero, Adj. Track No. 19, 50¢10%

Adjustable Track Tandem Trolley Track No. 16, 50¢10%

Seal, Steel Track No. 8, \$2.25

Auto Adj. Track No. 22, 50¢5%

Trolley B. D. No. 17, \$1.25; P. D. No. 120, \$2.25; No. 121, \$2.45; No. 150, \$2.50

Safety Underwriters F. D. No. 101.....50%

Tandem No. 41, 2 1/2 and 3 60¢10%

132, Adjustable Track No. 132.....50¢5%

Royal, Adjustable Track No. 122.....50¢10%

Ives' Wood Track No. 1, \$2.25

Trolley B. D. No. 20, 50¢10%

Trolley B. D. No. 24, \$1.30; No. 7, \$1.40

Roller Bearings, Nos. 37, 38, 39, 41, 43, 44, Sizes 1 and 2, 70¢7 1/2%

Anti-Friction, No. 42; No. 44, sizes 2 1/2 and 3, 60%

Hinged Tandem No. 48, 60¢5%

Folding Door B. B. Swivel No. 135.....40%

Hangers— Garment—

Pullman Trouser, 3/4 gro., No. 1 \$9.00; No. 4, \$24.00; No. 5, \$16.50; No. 8, Black Enamel, \$7.50; No. 10, \$21.00; No. 12, \$8.00; No. 13, Rods, \$9.00; No. 18, Loops.....\$10.00

Victor Folding.....3/4 gro. \$9.60

Joist and Timber—

Lane Bros. Co.....36%

Hasps—

Griffin's Security Hasp.....50¢10%

McKinney's Perfect Hasp, 3/4 doz.....60%

Hatchets—

Regular list, first qual. 50¢10¢60%

Second quality.....60¢10¢10%

Heaters, Carriage—

Clark, No. 5, \$1.25; No. 5R, \$1.50; No. 3, \$1.75; No. 3D, \$2.00; No. 1, \$3.00.....25%

Big Hit Assortment, 3/4 case.....\$13.80

Leader, 3/4 case.....\$9.00

Clark Coal, doz.....\$0.75

A B C Coal, doz.....\$0.60

Sadiron Coal, box 50 pieces.....\$0.75

Hinges—

Blind and Shutter Hinges

Surface Gravity Locking Blind; Doz. Sets with Fastenings, No. 2, \$0.70; No. 5, \$1.25; No. 5, \$1.40

Mortise Shutter.....80%

Mortise Reversible Shutter.....80%

North's Automatic Blind Fixtures, No. 2, 2, Wood, \$9.00; No. 3, for Brick, \$11.50.....10%

Charles Parker Co.....70¢75%

Parker Wire Goods Co.

Fale & Benjamin Automatic Blind Hinges.....20%

Fale's Blind Awning Hinges, No. 110, for wood, \$9.00; No. 111, for brick, \$9.00.....20%

Reading's Gravity.....50¢10%

Stanley's Steel Gravity Blind Hinges, No. 1647, 3/4 doz, sets, without screws, \$1.00; with screws, \$1.30.

Wrightsville Hardware Co.:

O. S., Lull & Porter.....75¢5%

Acme, Lull & Porter.....75%

Queen City Reversible.....75%

Shepard's Noiseless, Nos. 60, 65, 55.....75¢5%

Masons' Etc.

Cleveland Wire Spring Co.:
Steel Brick, No. 122.....each \$1.05
Steel Mortar, No. 158.....each \$1.35

Hoes— Eye—

Scott and Oval Pattern,
60¢ 10¢ 60¢ 10¢ 10¢
Grub, list Feb. 23, 1899,
70¢ 10¢ 70¢ 10¢ 10¢
D. & H. Scott.....27 1/2%

Handled—

Cronk's Weeding, No. 1, \$2.00; No. 2, \$2.50
Star Double Bit.....\$2.50

Holders— Bit—

Angular, 3/4 doz, \$24.00.....45&10%

Broom—

Pullman Broom, 3/4 gro.....\$9.00

Door—

Bardsley's, Iron, 40%; Bronze.....20%
Empire.....50%
Pullman.....25%
Richards Mfg. Co., No. 117, Ever-
ready, 40%; Nos. 118, 119, Sure
Grip.....50%
Superior.....40%

File and Tool—

Nicholson File Holders and File
Handles.....33 1/2&40%

Fruit Jar—

Triumph Fruit Jar Holder, 3/4 doz, \$2.00

Nipple—

Curtis Nipple Holders.....5%

Trace and Rein—

Fernald Double Trace Holder, 3/4 doz,
pairs.....\$1.25
Dash Rein Holder, 3/4 doz.....\$1.25

Hones—Razor—

Pike Mfg. Co., Belgian and Swaty,
50%; Germantown.....33 1/2%

Hooks—Cast—

Bird Cage, Reading.....50%
Clothes Line, Reading List.....50&5%
Coat and Hat Iron, Reading.....50%
Coat and Hat, Bronze Metal, Read-
ing.....33 1/2%
Coat and Hat, Wrightville.....60&5%
Harness, Reading List.....50%

Wire—

Belt, Nos. 1 to 15.....60¢ 80¢ 45%
Wire C. & H. Hooks.....80¢ 80¢ 10%
Parker Wire Goods Co., King.....75&10%
Wire Goods Co.:
Acme, 60&10%; Chief, 75¢ 75&10%;
Crown, 75¢ 10¢ 80%; Czar, 70%; Cap-
itol 80%; Czar Harness, 50&10%;
Ceiling, 75¢ 80%.

Miscellaneous—

Hooks, Bench, see Stops, Bench.
Bush, Light, doz., \$6.20; Medium,
\$6.75; Heavy, \$7.65
Grass, best, all sizes, per
doz.....\$2.75¢ \$3.00
Grass, common grades, all sizes,
per doz.....\$1.25¢ \$1.50
Hooks and Eyes:
Brass.....60¢ 60¢ 10%
Malleable Iron.....70¢ 70¢ 10%
Covert Mfg. Co. Gate and Seattle
Hooks.....25%
Turner & Stanton Co. Cup and
Shoulder.....55&10%
Bench Hooks—See Bench Stops.
Corn Hooks—See Knives, Corn.

Hose, Rubber—

Garden Hose, 3/4-inch:
Competition.....ft. 6¢ 6 1/2¢
3-ply Guaranteed.....ft. 8 1/2¢ 9¢
4-ply Guaranteed.....ft. 9 1/2¢ 12¢
Cotton Garden, 3/4-in., coupled:
Low Grade.....ft. 5 1/2¢ 9¢
Fair Quality.....ft. 10¢ 11 1/2¢

Irons— Sad—

From 1/2 to 10.....1b. 2% 24¢
Mrs. Porter's, cents per set:
Nos. 50 55 60 65
Jap'd Caps.....86 93 96 93
Tin'd Caps.....91 88 1.01 98

Bar and Corner—

Richards Mfg. Co., Bar, 60&10%;
Corner.....60%

Jacks, Wagons—

Covert Mfg. Co.:
Auto Screw.....30&10%; Steel, 50%
Lane's Steel.....35&5%
Richards' Tiger Steel, No. 130.....50&10%

Ladder—

Richards Mfg. Co., Ladder Jacks.....53%

Jointers—

Pike Mfg. Co., Saw Jointers, \$7.00.....43%

Knives—**Butcher, Kitchen, &c.—**

Foster Bros.' Butcher, &c.....30%

Corn—

Columbian Cutlery Co., Wilcut
Brand Knives and Hooks.....60%

Drawing—

Standard List.....80¢ 80¢ 1/2%
C. E. Jennings & Co., Nos. 45, 46,
25&7 1/2%
Jennings & Griffin, Nos. 41, 42,
66¢ 67 1/2%
Swan's.....66¢ 67 1/2%
L. & I. J. White.....20&5¢ 25%

Hay and Straw—

Serrated Edge, per doz, \$5.00¢ 5.50
Iwan's Sickle Edge.....3/4 doz, \$9.00
Iwan's Serrated.....3/4 doz, \$9.50

Miscellaneous—

Farriers'.....doz. \$2.60¢ 3.55

Knobs—

Base, 2 1/2-inch, Birch or Maple,
Rubber Tip.....gro. \$1.25¢ 1.40
Door, Mineral.....doz. 65¢ 1.00
Door, Por. Jap'd.....doz. 70¢ 1.75
Door, Por. Nickel.....doz. \$2.05¢ 2.15
Bardsley's Wood Door and Shutters.....10%

Ladders, Store, &c.—

Lane's Store.....25%
Myers' Noiseless Store Ladders.....50%
Richards Mfg. Co.:
Improved Noiseless, No. 112.....50%
Climax Shelf, No. 113.....50%
Trolley, No. 109.....50%

Ladles, Melting—

L. & G. Mfg. Co.'s list, Melting and
Pumpers.....25%
P. S. & W.....40&10%
Reading.....50&10%

Lamps,—

Hammer's M. I. Hand.....45%

Lanterns—Tubular—

Regular, No. 0.....doz. \$1.00¢ 1.50
Side List, No. 0.....doz. \$1.25¢ 1.75
Hinge Globe, No. 0.....doz. \$1.25¢ 1.75
Other Styles.....40&5%

Bull's Eye Police—

8-inch.....\$3.75¢ 4.00

Latches— Thumb—

Roggin's Latches, Jap'd, with
Screws.....doz. 35¢ 40¢

Door—

Cronk & Carrier Mfg. Co., No. 101,
Richards' Bull Dog, Heavy, No.
125.....50&5%
Richards' Trump, No. 127.....\$1.50

Leaders, Cattle—

Small.....doz. 50¢; large, 60¢
Covert Mfg. Co.: Cotton, 55%; Hemp,
45%; Jute, 55%; Sisal, 45%.

Lifters, Transom—

Reading, Iron, 50&5%; Bronze
Metal.....33 1/2%
R. & E.....10%

Lines—

Wire Clothes, Nos. 13 19 20
100 feet.....\$2.30 1.95 1.75
75 feet.....\$1.95 1.65 1.59

Samson Cordage Works:
Solid Braided Chalk, Nos. 0 to 3, 40%
Solid Braided Masons'.....30%
Silver Lake Braided Chalk, No. 0,
\$6.00; No. 1, \$8.50; No. 2, \$7.00; No.
3, \$7.50.....30%
Masons' Lines, Shade Cord, &c.:
White Cotton, No. 3 1/2, \$1.50; No. 4,
\$2.00; No. 4 1/2, \$2.50; Colors, No. 3 1/2,
\$1.75; No. 4, \$2.25; No. 4 1/2, \$2.75;
Linen, No. 3 1/2, \$2.50; No. 4, \$3.50;
No. 4 1/2, \$4.50.....30%
Tent and Awning Lines: No. 5,
White Cotton, \$7.50; Drab Cotton,
\$5.50.....20%
Clothes Lines, White Cotton: 50 ft.,
\$2.75; 60 ft., \$3.25; 70 ft., \$3.75; 75
ft., \$4.00; 80 ft., \$4.25; 90 ft., \$4.75;
100 ft., \$5.25.....30%
Turner & Stanton Co.:
Solid Braided Chalk, Masons' and
Awning Lines.....40%
Clothes Lines, White Cotton.....40%
Shade Cord, Cotton or Linen.....30%

Locks— Cabinet—

Cabinet Locks.....33 1/2¢ 32 1/4¢ 5%

Door Locks, Latches, &c.—

NOTE.—Net Prices are very often made
on these goods.

Reading Hardware Co.....33 1/2%
R. & E. Mfg. Co.....10%

Padlocks—

R. & E. Mfg. Co. Wrought Steel and
Brass.....75¢ 10%

Sash, &c.—

Ives' Patent:
Automatic Gravity Metal Sash, 3/4
gro. \$149.58.....25%
Window Ventilating.....25%
Pullman Patent Ventilating Lock.....25%
Reading Sash Locks, Iron.....50%
Reading Sash Locks, Bronze Metal,
33 1/2%.

Machines—Boring—

Com. Up'r't, without Augers.....\$2.00¢ 2.25

Com. Angl'r, without Augers.....\$2.25¢ 2.50

Ford Auger Bit Co.....\$22.00
Jennings, Nos. 1 and 4.....25&7 1/2%
Mills' Falls.....5.75
Snell's, Upright, \$2.65; Angular, \$2.90
Swan's Improved.....40&10%

Corking—

Reisinger Invincible Hand Power.....
3/4 doz, \$48.00

Forming, Bending, Etc—

Royal Forming, Bending, Crimp-
ing and Fluting, Hand Power,
each, \$20.00.....40%

Hoisting—

Moore's Anti-Friction Chain Hoist.....30%
Moore's Hand Hoist, with Lock.....20%
Moore's Brake.....20%
Moore's Cyclone High Speed Chain
Hoist.....25%

Ice Cutting—

Chandler's.....12 1/2%

Mallets—

Hickory.....45¢ 45¢ 50%
Lignumviter.....45¢ 45¢ 50%
Tinnern's Hickory and Apple
wood.....doz. 45¢ 45¢ 50%

Mangers, Stable—

Swett Iron Works.....50%

Mats, Door—

Acme Flexible Steel.....50%
Elastic Steel (W. G. Co.), new list, 50%
Everlasting Flexible Steel.....40%

Mills, Coffee, &c.—

Enterprise Mfg. Co.:
Coffee.....20¢ 25¢
Bone, Shell and Corn.....25&10%
Parker's Columbia and Victoria.....33 1/2%
Parker's Box and Side.....50&10%
Swift, Lane Bros. Co.....30%

Motors, Water—

Pike Mfg. Co., Tool and Knife
Grinding.....33 1/2%

Mowers, Lawn—

NOTE.—Net prices are generally quoted

Cheapest, 10-in., \$2.00; advance
10¢ for each size.

Cheap, 10-in., \$2.25; advance 15¢
20¢ for each size.

Better Grade, 10-in., \$3.00; ad-
vance 25¢ for each size.

High Grade.....\$1.50 1.75 5.00 5.25
Continental, High and Low Wheel.....
50&10%

Great American.....65%
Great American Ball Bearing.....65%
Quaker City.....65%
Pennsylvania, High and Low Wheel.....
50&10%

Pennsylvania, Jr., Ball Bearing.....
50&10%

Pennsylvania Golf, 6 Knives, Low
Wheel, 33 1/2%; High Wheel.....45%

Pennsylvania Golf, Ball Bearing, 7
Knives, High Wheel.....33 1/2%
Pennsylvania Horse, 30 and 38 inch,
33 1/2%
Pennsylvania Pony or Two Man, 40&5%
Pennsylvania Grand Horse, 30 and
38 in.....33 1/2%

Nails—

Wire Nails and Brads, Miscel-
laneous.....85¢ 10%
Cut and Wire, See Trade Report.
Hungarian, Finishing, Upholster-
ers, &c. See Tacks.

Horse—

Jobbers' Special Brands,
per lb. 9¢

Picture—

1 1/2 2 2 1/2 3 in.
Brass Hd. gro. 15 55 60 70
Por. Head, gro., all sizes.....80¢

Upholsters—

Brass.....30%
Plated.....30&10%

Nuts— Blank or Tapped.

Cold Punched: Off list.
Square.....5.10¢ 5.20¢
Hexagon.....5.70¢ 5.80¢
Square, C. T. & R.....5.50¢ 5.60¢
Hexagon, C. T. & R.....5.30¢ 5.40¢
Hot Pressed: Off list.
Square.....5.50¢ 5.60¢
Hexagon.....5.95¢ 6.05¢

Oakum—

Best.....1b. 6 1/2¢
U. S. Navy.....1b. 6 ¢
Navy.....1b. 5 ¢
Plumbers' Spun Oakum.....2 1/4¢ 3 ¢

Oil—

Pike Mfg. Co., Stonoil.....40%

Oil Tanks—See Tanks, Oil.**Oilers—**

Steel, Copper Plated.....75¢ 10%

Chase or Paragon:
Brass and Copper.....50¢ 10%
Zinc.....65¢ 10¢ 70%
Railroad.....60¢ 10¢ 10%

American Tube & Stamping Co.:
Spring Bottom Cans.....70¢ 70¢ 10%
Railroad Oilers, &c.....60¢ 60¢ 10%

Hero Fruit Jar Co.:
Spring Bottom Cans.....70¢ 70¢ 10%
Railroad Oilers, etc.....60¢ 60¢ 10%

Malleable, Hammers Improved, Nos.
11, 12 and 13, 10%; Old Pattern,
Nos. 1, 2, 3, 4, 50%.

Maple City Mfg. Co.:
Spring Bottom Cans.....70¢ 70¢ 10%
Railroad Oilers, &c.....60¢ 60¢ 10%

Openers, Can—

Triumph Shear Can Openers, doz. \$1.20

Egg—

Hartigan Nickel Plate, 3/4 doz., \$2.00;
Silver Plate, \$4.00.

Packing—

Asbestos Packing, Wick and
Rope, any quantity.....15¢

Rubber—

(Fair quality goods.)
Sheet, C. I.....11¢ 12¢
Sheet, C. O.....11¢ 12¢
Sheet, C. B. S.....12¢ 13¢
Sheet, Pure Gum.....40¢ 45¢
Sheet, Red.....40¢ 50¢
Jenkins' '96, 3/4 lb, 80¢.....25%

Miscellaneous—

American Packing.....1b. 7¢ 10 ¢
Cotton Packing.....1b. 16¢ 25 ¢
Italian Packing.....1b. 9¢ 10¢
Jute.....1b. 4¢ 1/4¢
Russia Packing.....1b. 9¢ 10¢

Pails, Galvanized—

Net, per dozen.
Quarts.....8 10 12 14 16
Light.....\$1.45 1.65 1.80 2.00 2.35
Ex. heavy.....\$2.65 2.85 3.00 3.35
Rd. Bottom
Fire Pails.....1.95 2.10 2.30
Well Pails 1.95 2.15 2.35

Paint—

Dixon's Silica-Graphite, in 1 gal.
pails and 5 gal. kegs, 25%; pack-
ages of larger size.....20%

Pans— Dripping—

Standard List.....75¢ 10¢ 5%

Refrigerator, Galva—

Inch.....12 14 16 18
Per doz.....\$1.75 2.25 2.80 3.15

Paper—Building Paper

Per roll.
Rosin Sized Sheathing: 500 sq. ft.
Light weight, 25 lbs. to roll, 38¢
Medium weight, 30 lbs. to roll,
45¢
Heavy weight, 40 lbs. to roll, 60¢
Black Water Proof Sheathing,
500 sq. ft., light weight, 65¢;
medium weight, 95¢; heavy
weight, \$1.30.
Deafening Felt, 9 and 6 sq. ft.
to lb., ton.....\$40.00
Red Rope Roofing, 250 sq. ft.
per roll.....\$1.75

Tarred Paper—

1 ply (roll 100 sq. ft.), ton,
carloads, \$31.00; less than
carloads.....\$32.00

2 ply (roll 108 sq. ft.), 40 lb., 48¢
3 ply (roll 108 sq. ft.), 60 lb., 68¢
Slater's Felt (roll 500 sq. ft.),
per ton, \$35.00; per roll.....70¢

Sand Paper and Cloth—

Flint and Emery.....50¢ 10%
Garnet Paper and Cloth.....25%

Parers—Apple—

Goodell Co.:	
Family Bay State.....	doz. \$15.00
Improved Bay State.....	doz. \$35.00
New Lightning.....	doz. \$7.00
Turn Table.....	doz. \$6.00
White Mountain.....	doz. \$5.00
Bonanza Improved.....	each \$7.50
New Century.....	each \$10.00
Ranger.....	each \$20.00
Rapid Apple Slicer.....	each \$25.00
Reading Hardware Co.:	
Advance.....	doz. \$1.00
Baldwin.....	doz. \$1.00
Reading 72.....	doz. \$3.25
Reading 78.....	doz. \$6.25

Orange—

Goodell Co., Success.....	each \$20.00
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Potato—

Saratoga.....	doz. \$7.00
White Mountain.....	doz. \$6.00

Picks and Mattocks—

List.....	75¢@10%
Cronk's Handled Garden Mattock.....	doz. \$3.50
doz. \$6.00.....	33½%

Pins, Escutcheon—

Brass.....	50¢@50¢@10%
Iron.....	60¢@60¢@10%

Pipe, Cast Iron Soil—

Eastern Prices:	
Standard, 2 1/2 in.....	68%
Extra Heavy, 2 1/2 in.....	74%
Fittings, Standard and Heavy.....	80%

Pipe, Merchant—

Carltons to Consumers:	
Steel.....	%
Blk. Galv. Bk. Galv.....	%
1/2 in. and 1/2 in.....	%
3/4 in.....	%
1 in.....	%
1 1/2 in.....	%
2 in.....	%
2 1/2 in.....	%
3 in.....	%
4 in.....	%
5 in.....	%
6 in.....	%
8 in.....	%
10 in.....	%
12 in.....	%

Pipe, Vitrified Sewer—

Carlton lots.	
Standard Pipe and Fittings, 3 to 2 1/2 in., f.o.b. factory:	
First-class.....	85%
Second-class.....	87%

Pipe, Stove—

Per 100 joints.	
C. L. L. C. L.	
Wheeling Corrugating Co.'s Nested:	
5 in., Uniform Color.....	\$6.00
6 in., Uniform Color.....	7.40
7 in., Uniform Color.....	7.40
7 in., Uniform Color.....	8.40

Planes and Plane Irons—

Wood Planes—	
Bench, first qual.....	30¢@30¢@5%
Bench, second qual.....	40¢@40¢@5%
Molding.....	25¢@25¢@5%
Chapin-Stephens Co.:	
Bench, First Quality.....	30%
Bench, Second Quality.....	40%
Molding and Miscellaneous.....	25%
Toy and German.....	30%
Union.....	60%

Iron Planes—

Union.....	60%
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Plane Irons—

Wood Bench Plane Irons.....	25%
Buck Bros.....	30%
Chapin-Stephens Co.....	25%
Union.....	50%
L. & J. White.....	20¢@25¢@25%

Planters, Corn, Hand—

Kohler's Eclipse.....	doz. \$7.50
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Plates—

Felice.....	lb. 3¢@4¢
Avery Stamping Co.:	
Standard Vrot. St. Felice Plates in 100 lb. kegs, per 100 lb., 3/4-in. to 1 1/4-in., \$4.00 net; 1 1/4-in. to 2-in., inclusive, \$3.75 net.	

Steel Pipe Hook—

Never-Break.....	75¢@10%
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Pliers and Nippers—

Button Pliers.....	75¢@75¢@10%
Gas Burner, per doz., 5 in., \$1.25 @ \$1.30; 6 in., \$1.45, \$1.50.	
Gas pipe.....	7 8 10 12 in.
Acme Nippers.....	50%
Cronk & Carrier Mfg. Co.:	
American Button.....	80%
Improved Button.....	75¢@10%
No. 82 Linemen's.....	60%
Stub's Pattern.....	45%
Combination and others.....	33½%
Elmore Tool Mfg. Co.:	
Gas Pliers.....	70%
Wire and Cutting Pliers.....	75%
Heller's Farriers' Nippers, Pincers and Tools.....	40¢@10%

P. S. & W. Tinnars' Cutting Nippers.....	20%
Utica Drop Forge & Tool Co.:	
Pliers and Nippers, all kinds.....	40%

Plumbs and Levels—

Chapin-Stephens Co.:	
Plumbs and Levels.....	30¢@30¢@10%
Chapin's Imp. Brass Cor. 40¢@40¢@10%	
Pocket Levels.....	30¢@30¢@10%
Extension Sigs.....	30¢@30¢@10%
Machinists' Levels.....	40¢@40¢@10%
Disston & Sons:	
Shafting Levels.....	60¢@10%
Pocket Levels.....	60¢@10%
Plumbs and Levels.....	60¢@10%
Track Level and Gauge.....	60¢@10%

Points, Glaziers'—

Bulk and 1-lb. papers.....	7b. 9¢
1/2-lb. papers.....	7b. 9¢
1/4-lb. papers.....	7b. 10¢

Police Goods—

Manufacturers' Lists.....	25¢@25¢@5%
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Polish—Metal, Etc—

Ladd Co.:	
Putzade Liquid, 1/2 gro., 1/2 pts., \$12.00; 1 pts., \$20.00; 1 qts., \$40.00; 1 doz., 1/2 gals., \$6.35; 1 gals., \$12.00.	
Pretole Liquid No. 1 (1/2 qt.), 1/2 doz., \$3.00; No. 2 (1 qt.), \$6.00; 1 doz., \$12.00.	
Prestoline Paste.....	40%
George William Hoffman:	
U. S. Metal Polish Paste, 3 oz. boxes, 1/2 doz., 50¢; 1/2 doz., \$4.50; 1/2 lb boxes, 1/2 doz., \$1.25; 1 lb boxes, 1/2 doz., \$2.25.	
U. S. Liquid, 8 oz. cans, 1/2 doz., \$1.25.	
Barkeepers' Friend Metal Polish, 1/2 doz., \$1.75.	

Stove—

Black Eagle Benzine Paste, 5 lb cans, 1/2 lb 10¢	
Black Eagle, Liquid, 1/2 pt. cans, 1/2 doz. 75¢	
Black Jack Paste, 1/2 lb cans, 1/2 gr. \$9.00	
Black Kid Paste, 5 lb cans, each, \$9.65	
Ladd's Black Beauty Liquid, per 100 lbs.....	\$6.75
Joseph Dixon, 1/2 gr. \$2.25, 1 lb \$3.50	
Dixon's Plumbago.....	1/2 lb 8¢
Fireside.....	1/2 gr. \$2.50
Gem, 1/2 gr. \$1.50.....	10%
Japanese.....	1/2 gr. \$3.50
Jet Black.....	1/2 gr. \$3.50
Peerless Iron Enamel, 10 oz. cans, 1/2 doz. \$1.50	

Window Polish—

Benj. P. Forbes:	
Glasbrite, 1 lb cans, each.....	75¢
Glasbrite Factory, 10 lb pails, 1/2 lb.....	25¢

Poppers, Corn—

1 qt. Square.....	doz. \$0.80; gro. \$8.75
1 qt. Round.....	doz. \$0.90; gro. \$10.00
1 1/2 qt. Square.....	doz. \$1.20; gro. \$12.00
2 qt. Square.....	doz. \$1.50; gro. \$15.00

Pots, Glue—

Entamee.....	30¢@10%
Tinned.....	30¢@5%

Powder—

Black Sporting:	
Kegs (25 lb.), \$5.00 @ 5.50	
Half Kegs (12 1/2 lb.), \$2.75 @ 3.00	
Quarter Kegs (6 1/4 lb.), \$1.50 @ 1.65	
Canisters, pounds.....	25
Canisters, 1/2 pounds.....	15
Canisters, 1/4 pounds.....	12

NOTE.—Prices vary according to territory.

Presses—

Enterprise Mfg. Co., Fruit, Wine and Jelly.....	20¢@25%
Lard Presses and Sausage Stuffers.....	25¢@25¢@7 1/2%

Seal Presses—

Morrill's No. 1, 1/2 doz., \$20.00.....	50%
Morrill's Pocket, \$20.00.....	50%

Pruning Hooks and Shears

See Shears.

Pullers, Nail, Etc.—

Elmore Tool Mfg. Co.:	
Drop Forged Tack Claws.....	50¢@10%
Standard Tack Claws.....	10
Nail Pullers.....	33 1/2¢@1 1/2%
Miller's Falls, No. 3, 1/2 doz., \$12.00.....	40%
Morrill's No. 1, Nail Puller, 1/2 doz., \$20.00.....	33 1/2¢@10%
Pearson Spike Puller, each, \$15.00.....	25%
Parrot Tack and Stub Pullers, 1/2 doz.....	\$1.20
The Scranton Co. Case Lots:	
No. 2B (large).....	\$5.50
No. 3B (small).....	\$5.50

Pulleys, Single Wheel—

Inch.....	1 1/2 1 3/4 2 3
Acme or Tackle.....	
doz.....	\$0.30 15 60 1.05
Hay Fork, Swivel or Solid Eye.....	
doz., 1/4 in., \$1.25; 5 in., \$1.55	
Inch.....	2 2 1/4 2 1/2
Hot House, doz.....	\$0.65 .85 1.20
Inch.....	1 1/4 1 1/2 1 3/4

Screer, doz.....	\$0.16 .19 .23 .30
Inch.....	1 1/2 2 2 1/4 2 1/2
Side, doz.....	\$0.25 .40 .55 .60
Inch.....	1 1/2 1 3/4 2 2 1/2

Sash Pulleys—

Common Frame; Square or Round End, per doz., 1 1/2 and 2 in.....	17¢@20¢
Auger Mortise, no Face Plate, per doz., 1 1/2 and 2 in.....	20¢@21¢
Acme, No. 35, 1 1/2 in., 19¢; 2 in., 20 1/2¢	
American Pulley Co.:	
Wrought Steel American Plain Axle.....	50¢@10%
Wrought Steel, Eagle, 1/2 doz., 1 1/2 in., 17¢; 2 in., 20¢; 2 1/2 in., 27¢	
Top Notch, Electrically Welded, Nos. 3 and 4, 1/2 doz.....	19¢
Common Sense.....	1/2 doz, 20¢
Merit, 1/2 doz., 2 1/4 in.....	37¢
Fox-All-Steel, Nos. 3 and 7, 2 in.....	doz. 50%
Grand Rapids All Steel Noiseless.....	50%
Niagara, No. 25, 1 1/2 in., 19¢; 2 in., 20 1/2¢	
No. 26 Trow, 1 1/2 in., 14 1/2¢; 2 in., 16 1/2¢	
Star, No. 26.....	1 1/2 in., 19¢; 2 in., 20 1/2¢
Tackle Blocks—See Blocks.	

Pumps—

Cistern.....	60%
Pitcher Spout.....	75¢@10¢@80
Wood Pumps, Tubing, &c.....	50%
Barnes Mfg. Co.:	
Dbl. Acting (low list).....	50%
Pitcher Spout.....	80%
Daisy Spray Pump.....	1/2 doz. \$6.50
Goulds Mfg. Co.:	
Double-Acting Thresher Tank.....	\$5.00
Diaphragm No. 3, Side Suction.....	\$11.50
Empire, Advance, Seneca, D. A. Shallow and Deep Well (low list).....	50%
Spraying and Whitewashing.....	\$2.45
F. E. Myers & Bros. (low lists):	
Double Acting Force and Lift: Cistern and Well; Horse; Windmill; Ratchet Handle; Pump Stands; Hydro-Pneumatic; Bulldozer; Power; Spray; Ashland Force and Lift.....	50%
Thresher Tank—Myers and Faultless Low Down Tank.....	\$5.00
Century Low Down Tank, No. 470.....	\$5.25
Century Low Down Ratchet Handle Tank, No. R470.....	\$5.50

Pump Attachments—

Chicago Hdw. & Fdy. Pump Spout Attachments, each.....	\$0.27
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Pump Leathers—

Plunger and Valve Leathers—Per gro.....	
No.....	1 2 3 4
.....	\$5.00 6.00 7.00 8.00
Cup Leathers—Per 100:	
Inch.....	2 1/2 3 3 1/2 4
.....	\$5.00 7.00 9.00 12.00

Punches—

Saddlers' or Drive, good.....	doz. 50¢@75¢
Spring, single tube, good quality.....	1.75
Revolving (4 tubes).....	doz. \$3.50
Bemis & Call Co.'s Cast St'l Drive.....	50%
Elmore Tool Mfg. Co.:	
Machinists' Center.....	40%
Tinnars' Solid, 50%, Prick.....	50%
Morrill's Nos. 1A, 1A, 1B, 1C, 1D, \$15.00.....	50%
Hercules, 1 die, each \$5.00.....	50%
Niagara Hollow Punches.....	40%
Niagara Solid Punches.....	55%
Tinnars' Hollow, P. S. & W. Co.....	25%
Tinnars' Solid, P. S. & W. Co.....	40%

Rail—Barn Door, &c.—

Sliding Door, Painted Iron.....	2 1/2¢@2 1/4¢
Sliding Door, Wrought Brass.....	1 1/2 in., lb., 36¢

Cronk's:	
Double Braced Steel Rail.....	1/2 ft. 2 1/2¢
O. N. T. Rail.....	2 1/2¢
Griffin's:	
xxx 1/2 100 ft., 1 x 3-16 in., \$3.25; 1 1/2 x 3-16 in., \$3.75.	
Hinged Hanger, 100 ft., 1 x 3-16 in., \$3.50; 1 1/2 x 3-16 in., \$4.00.	
Lane's:	
Hinged Track, 100 ft.....	\$3.45
O. N. T., 100 ft., 1 in., \$3.12 1/2; 1 1/2 in., \$3.45; 1 3/4 in., \$4.00.	
Standard, 1 1/2 in.....	100 ft. \$4.00
Lawrence Bros.:	
1 x 3-16 in., 100 ft., \$7.50; 1 1/2 x 3-16 in., \$8.75.....	55¢@7 1/2%
Trolley, No. 301, 1/2 ft.....	3¢
McKinney's:	
Hinged Hanger Track, 1/2 ft., 1 1/2 in.....	60¢@5%
1 x 3-16 Track.....	55¢@7 1/2%
Myers' Stayon Track.....	60¢@10%
Richards Mfg. Co.:	
Common, 1 x 3-16 in., \$3.00; 1 1/2 x 3-16, \$3.25; 1 3/4 x 3-16, \$3.50.	
Special Hinged Hanger Rail.....	60¢@10%
Lag Screw Rail, No. 65.....	50%
Gauge Trolley Track, 1/2 ft., No. 31, 9¢; No. 32, 14¢; No. 33, 20¢.	
No. 50.....	60¢@10%
Nos. 61, \$3.00; 62, \$3.25; 63, \$3.50; 64, \$4.00; 45, \$3.25; 46, \$3.50; 49, No. 1, \$3.25; 49, No. 2, \$3.50.	

Rakes—

Cronk's:	
Steel Garden: Champion, 1/2 doz., 12-tooth, \$3.75; 14-tooth, \$4.00; 16-tooth, \$4.25; Ideal, 1/2 doz., 12-tooth, \$3.00; 14-tooth, \$3.30; 16-tooth, \$3.60.	
Victor, 12-tooth, \$2.25; 14-tooth, \$2.50; 16-tooth, \$2.75.	
Queen City Lawn, 1/2 doz., 20 teeth, \$2.35; 21, \$2.50.....	net
Anticlog Lawn, 1/2 doz.....	\$3.50
Malleable Garden.....	50¢@10%
Ideal Steel Garden, 1/2 doz., 12 teeth, \$15.00; 14, \$16.00; 16, \$18.00.....	80%
Kohler's:	
Jumbo Lawn, 36-tooth.....	1/2 doz. \$5.00
Lawn Queen, 20-tooth.....	1/2 doz. \$2.65
Lawn Queen, 24-tooth.....	1/2 doz. \$2.75
Paragon, 20-tooth.....	1/2 doz. \$2.40
Paragon, 24-tooth.....	1/2 doz. \$2.50
Steel Garden, 14-tooth.....	1/2 doz. \$2.40
Malleable Garden, 14-tooth, 1/2 doz.....	\$1.75@2.00

Rasps, Horse—

Disston's.....	75%
Heller Bros.....	70¢@70¢@10¢@5%
Liveright Bros.' Gold Medal.....	70%
McCaffrey's American Standard.....	60¢@10%
New Nicholson.....	70¢@10¢@75%
See also Files.	

Razors—

W. H. Compton Shear Co.....	30%
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Reels, Fishing—

Hendryx:	
M 6, Q 6, A 6, B 6, M 9 1/2, M 16, Q 16, A 16, B 16, 4008, Rubber Popolo, Nieked Popolo.....	20%
Aluminum, German Silv., Bronze.....	25%
1210 N, 121 N.....	20%
3004 N, 66 N, 6 R.....	20%
4 N, 6 PN, 24 N, 26 PN.....	20%
2904 P, 33 1/2, 2904 PN, 21 1/2, 0924 N, 33 1/2, 0204 N, 33 1/2, 002904 P, 33 1/2, 802 N, 33 1/2, 966 PN, 2904 N, 974 PN.....	25%
5009 PN, 5009 N.....	20%
Competitor, 102 P, 102 PN, 202 P, 202 PN, 102 PR, 202 PR.....	20%
324 P, 304 PN, 00304 P, 00304 PN.....	33 1/2%

Registers—

Japanned, Electroplated and Bronzed.....	70%
White Porcelain Enamel.....	50¢@10%
Solid Brass or Bronze Metal.....	40%

Revolvers—

Single Action.....	\$5¢@10¢
Double Action, except 1/4 cal. \$2.00	
Double Action, 1/4 caliber.....	\$2.00
Automatic.....	\$1.00
Hammerless.....	\$1.50</

Stocks and Dies—

Blacksmiths'.....	50@50¢10%
Curtis Rev'ble Ratchet Die Stock.....	25%
Curby Screw Plates.....	25%
Green River.....	25%
Lightning Screw Plate.....	25%
Little Giant.....	25%
Reece's New Screw Plate.....	25%

Stoners, Cherry—

Enterprise.....	25@30%
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Stones, Axe—

Pike Mfg. Co., Axe Stones (all kinds).....	33 1/2%
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Glass Cutters' Stones—

Pike Mfg. Co., Glass Cutters' Stones and Supplies.....	40%
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Stones, Oil, &c.—

Pike Mfg. Co., 1907 list:.....	25%
Arkansas St. No. 1, 3 to 5 1/2 in. \$2.50	
Arkansas St. No. 1, 5 1/2 to 8 in. \$3.50	
Arkansas Slips No. 1.....	\$4.00
Lily White Washita, 4 to 8 in. 60¢	
Rosy Red Washita, 4 to 8 in. 60¢	
Washita St., Extra, 4 to 8 in. 50¢	
Washita St., No. 1, 4 to 8 in. 40¢	
Washita St., No. 2, 4 to 8 in. 25¢	
Lily White Slips.....	80¢
Rosy Red Slips.....	80¢
Washita Slips, Extra.....	80¢
Washita Slips, No. 1.....	70¢
Washita Slips, No. 2.....	40¢
India Oil Stones (entire list).....	33 1/2%
Quickcut Emery and Corundum Oil Stone, Double Grit.....	40%
Quickcut Emery and Corundum Oil Stone, Double Grit.....	33 1/2%
Quickcut Emery Rubbing Bricks.....	40%
Hindustan No. 1, R'g'lar. 10 lb. 8¢	
Hindustan No. 1, Small. 10 lb. 10¢	
Turkey Oil Stones, Extra, 5 to 8 in. 80¢	
Queer Creek Stones, 4 to 8 in. 80¢	
Queer Creek Slips.....	40¢
Sand Stone.....	6¢

Soythe Stones—

Pike Mfg. Co., 1907 list:.....	25%
Black Diamond S. S. 10 gro. \$12.00	
Lamolle S. S. 10 gro. \$11.00	
White Mountain S. S. 10 gro. \$9.50	
Green Mountain S. S. 10 gro. \$7.00	
Extra Indian Pond S. S. 10 gro. \$8.00	
No. 1 Indian Pond S. S. 10 gro. \$7.50	
No. 2 Indian Pond S. S. 10 gro. \$5.00	
Leader Red End S. S. 10 gro. \$5.00	
Quick Cut Emery.....	10 gro. \$10.00
Pure Corundum.....	10 gro. \$18.00
Crescent.....	10 gro. \$7.00
Emery Scythe Rifles, 2 Coat. \$8.80	
Emery Scythe Rifles, 3 Coat. \$11.00	
Emery Scythe Rifles, 4 Coat. \$13.20	
Balance of 1907 list.....	33 1/2%
Lectro (Artificial), 10 gro. \$12.00 33 1/2%	
Lightning (Artificial), 10 gro. \$12.00 33 1/2%	
Lightning (Artificial), 10 gro. \$18.00 33 1/2%	

Stoppers, Bottle—

Victor Bottle Stoppers.....	10 gro. \$9.00
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Stops—Bench—

Millers Falls.....	15¢10%
Morrill's, 10 doz., No. 1, \$10.00.....	50%
Morrill's, No. 2, \$12.50.....	50%
Seymour Smith & Son's.....	50%

Door—

Chapin-Stephens Co.....	50@50¢10%
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Plane—

Chapin-Stevens Co.....	20%
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Straps—Box—

Acme Embossed, case lots. 20@10¢10%	
Cary's Universal, case lots. 20@10¢10%	

Stoppers, Razor—

Pullman Safety Razor Blade, doz. \$8.50	
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Stuffers, Sausage—

Enterprise Mfg. Co., Stuffers and Lard Presses.....	25@25¢7 1/2%
P. S. & W. Co.....	10¢10&5%

Swings, Lawn—

Myers' Low Down Roller.....	\$6.25
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Tacks, Finishing Nails, &c.

American Carpet Tacks. 90¢25¢10%	
American Cut Tacks. 90¢25¢10%	
Swedes' Cut Tacks. 1. 90¢30¢10%	
Swedes' Upholsterers'. 90¢35¢10%	
Gimp Tacks.....	90¢35¢10%
Lace Tacks.....	90¢35¢10%
Trimmers' Tacks.....	90¢30¢10%
Looking Glass Tacks.....	65¢10%
Bill Posters' and Railroad Tacks. 90¢40¢10%	
Hungarian Nails.....	80¢10%
Finishing Nails.....	70¢10%
Trunk and Clout Nails. 75¢50¢10%	
NOTE—The above prices are for Straight Weights	
See also Nails, Wire.	

Double Pointed—

Double Pointed Tacks, 90¢6 tens@—%	
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Tapes, Measuring—

American Asses' Skin.....	50¢10%
Patent Leather.....	25@30¢5%
Steel.....	35¢10%
Chesterman's.....	25@35¢5%
Keuffel & Esser Co.:.....	
Favorite, Ass Skin.....	40¢10@50%
Favorite, Duck and Leather.....	25@35¢10%
Metallic and Steel, lower list, 35@35&5%; Pocket, 35@35&5%.	

Lufkins:

Asses' Skin.....	40¢10@50%
Metallic.....	30@30¢5%
Patent Bend, Leather.....	25@35¢25&10%
Pocket.....	40@40¢5%
Steel.....	35@35¢5%

Teeth, Harrow—

Steel Harrow Teeth, plain or headed, 1/2-inch and larger per 100 lb.....	\$2.55 @ \$2.80
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Thermometers—

Tin Case, Cabinet, Flange, Dairy, &c.....	30@35%
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Ties, Bale—Steel Wire—

Single Loop.....	82 1/2¢10%
Monitor, Cross Head, &c. 70¢2 1/2%	

Tinware—

Stamped, Japanned and Pieced, sold very generally at net prices.	
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Tops, Chimney—

Iwan Volcano Chimney Tops.....	55%
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Tools—Coopers'—

L. & I. J. White.....	20@20&5%
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Ice Tools—

Gifford-Wood Co.....	15%
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Saw—

Atkins' Cross Cut Saw Tools.....	35%
Simonds' Improved.....	33 1/2%
Simonds' Crescent.....	30%

Ship—

L. & I. J. White.....	25%
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Torches—

Hammers, Engine, 10 doz.....	\$1.50
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Traps—Fly—

Balloon, Globe or Acme, doz., \$1.15@1.25; gro. \$11.50@12.00	
Harper, Champion or Paragon, doz., \$1.25@1.40; gro. \$13.00@13.50	

Game—

Imitation Oneida.....	75¢10%
Newhouse.....	50&5%
Hayley & Norton.....	65&10%
Victor.....	75@75¢10%
Oneida Community Jump.....	70&5%
Stop Thief.....	60%
Tree Trap.....	60%
Hector.....	75@75&5%

Mouse and Rat—

Mouse, Wood, Choker, doz, holes, 12¢	
Mouse, Round or Square Wire, doz. 85¢90¢	

Trowels—

Diston Brick and Pointing.....	25%
Diston Plastering.....	20%
Diston "Standard Brand" and Gardner Trowels.....	30%
Kohler's Steel Garden Trowels, 10 gro., 5 in. \$1.80; 6 in. \$6.00.	
Never-Break, Forged Steel Garden Trowels, in 1 doz. boxes, 10 gro. \$6.50	
Woodrough & McParlin, Plastering.....	25%

Trucks, Warehouse, &c.—

McKinney Trucks.....	each, net \$10.00
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Tubs, Wash—

Net, per gross.	
No. 0 1 2 3	
Galvanized.....	\$29.00 48.00 55.00 62.00

Twine, Miscellaneous—

Flax Twine:	
No. 9, 1 1/4 and 1 1/2 lb. Balls. 21¢@23¢	
No. 12, 1 1/4 and 1 1/2 lb. Balls. 19¢@21¢	
No. 18, 1 1/4 and 1 1/2 lb. Balls. 16¢@18¢	
No. 24, 1 1/4 and 1 1/2 lb. Balls. 15¢@17¢	
No. 36, 1 1/4 and 1 1/2 lb. Balls. 15¢@17¢	
Chalk Line, Cotton 1 lb. 25¢	
Balls.....	24¢@29¢
Cotton Mops, 6, 9, 12 and 15 lb. to doz.....	84¢@21¢
Cotton Wrapping, 5 Balls to lb., according to quality. 13 1/2¢@21¢	
American 2-Ply Hemp, 1 1/4 and 1 1/2 lb. Balls.....	15¢@18¢
American 3-Ply Hemp, 1-lb. Balls.....	18¢@16¢
India, 2-Ply Hemp, 1 1/4-lb. Balls.....	17¢@9¢
India 3-Ply Hemp, 1-lb. Balls.....	7¢@9¢
India 2-Ply Hemp, 1 1/4-lb. Balls.....	7¢@9¢
2, 3, 4 and 5-Ply Jute, 1 1/4 lb. Balls.....	9¢@14¢
Maxon Line, Linen, 1 1/4 lb. Balls.....	17¢
No. 25 1/2 Mattress, 1 1/4 and 1 1/2 lb. Balls, according to quality.....	30¢@60¢
Wool, 3 to 6 ply.....	B 6¢; A 7 1/2¢

Vises—

Solid Box.....	60¢@60¢10%
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Parallel—

Fisher & Norris Double Screw Leg, each, Nos. 2, \$10.50; 3, \$16.00; 4, \$20.50; 5, \$27.00; 6, \$32.00.....	20%
Fisher-Brooks Bench and Woodworkers' Vises, No. 0, \$3.80; No. 1, \$5.90; No. 2, \$8.25; No. 3, \$10.50; No. 4, \$13.50.....	25%
Merrill's.....	25%
Millers Falls Oval Slide Pattern. 60¢10%	
Parker's:	
Victor, 20@25%; Regulars.....	20@25%
Vulcan's.....	40@45%
Combination Pipe.....	55@60%
Prentiss Vise Co.:	
Patent, Bicycle, Shepard, Gipsy, Adj. Column, Lewis Adj. Jaw.....	25%
Rapid Transit, Heavy Chipping.....	30%
Bull Dog, Anchor Line, Yankee Quick Lever, Lewis Solid Jaw, Eclipse Wrench Attachment.....	40%
Monarch.....	45%
Vise Jaw Caps.....	10%
Pullman Automatic Bench, 10 doz., No. 1, \$7.50; No. 2.....	\$9.50

Pipe—

Curtis & Curtis Malleable.....	25%
Parker's Combination:	
87 Series.....	60%
187 Series, 60&5%; No. 870, 40%.....	
Prentiss Vise Co.:	
Blake Combination, Prentiss Combination, Prentiss.....	60%
Malleable; Monarch Combination.....	65%
Rex Combination.....	70%
Peerless Pipe Grip.....	25%

Saw Filers

Diston's D 3 Clamp and Guide, 10 doz., \$24.00, 30%; Clamps.....	30%
Reading.....	50&10%

Wood Workers—

Prentiss Cabinet Makers'.....	40%
Wyman & Gordon's Quick Action, 6 in., \$6.00; 9 in., \$7.00; 14 in., \$8.00.	

Wads—Price per M.

B. E., 11 up.....	60¢
B. E., 9 and 10.....	70¢
B. E., 8.....	80¢
B. E., 7.....	80¢
P. E., 11 up.....	\$1.00
P. E., 9 and 10.....	1.25
P. E., 8.....	1.50
P. E., 7.....	1.50
Ely's B. E., 11 and larger \$1.70@1.75	
Ely's P. E., 12 to 20.....	\$1.00@1.25

Ware, Hollow—**Cast Iron, Hollow—**

Store Hollow Ware:	
Enameled.....	45¢10%
Ground.....	50¢5%
Plain or Unglazed.....	60%
Country Hollow Ware, per 100 lbs.....	\$2.75@3.00
White Enameled Ware:	
Maslin Kettles.....	65¢10%
Covered Ware.....	35¢10%
Tinned and Turned.....	45¢10%
Enameled.....	45¢10%
See also Pots, Glue.	

Enameled—

Agate Nickel Steel Ware.....	33 1/2%
El-an-ge.....	60&10%
Iron Clad Ware.....	70&10%
Lava and Volcanic, Enameled.....	40&10%

Tea Kettles—

Galvanized Tea Kettles:	
Inch.....	6 7 8 9
Each.....	45¢ 50¢ 55¢ 65¢

Steel Hollow Ware—

Avery Stamping Co.:	
Never-Break Spiders and Grids.....	65&10%
Steel Kettles, Maslin Scotch Bowls, Tin'd.....	60%
Steel Stew Pans, Stew Pots, etc. Porcelainized.....	50%
Cleveland Stamping & Tool Co.:	
Steel Spiders and Grids.....	65&5%
Solid Steel Kettles.....	60&5%

Warmers, Foot—

Pike Mfg. Co., Soapstone.....	40@40¢10%
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Washboards—

No. 500—Brass King, Single Surface, Open Back.....	\$3.00
801—Brass King, Single Surface, Open Back.....	\$2.50
802—Brass Junior, Single Surface, Open Back.....	\$2.25
803—White Hen, Spiral Crimp Glass.....	\$3.15
661—Royal Blue Enamel Single Surface, Ventilated Back.....	\$3.25
12—Our Best, Single Zinc, Soap Drainer.....	\$3.25
722—Soap Saver, Single Zinc, Iron Top.....	\$3.35
100—Northern Queen, Single Zinc, Perforated, Open Back.....	\$3.00
134—Universal, Single Zinc, Extra Family Size, Ventilated Back.....	\$2.90
710—Regal, Single Zinc, Extra Family Size, Ventilated Back.....	\$2.50
700—Banner Globe, Single Zinc, Ventilated Back.....	\$2.25
57—Peerless, Double Zinc, Spring Protector.....	\$3.0
56—Red Cross, Double Zinc, Swing Protector.....	\$3.60
17—North Star, Solid Zinc, Swing Protector.....	
707—Jewel, Single Zinc, Pail Size.	

Washers—Leather, Axle—

Solid.....	90@90¢10%
Patent.....	90@90¢5%
Coll: 1/4 1 1/4 1 1/2 1 3/4 per doz.	
9¢ 10¢ 11¢ 12¢	

Iron or Steel—

Size bolt....	5-16 3/8 1/2 5/8 3/4
Washers.....	\$1.90 4.00 2.70 2.50 2.30
The above prices are based on \$6.50 off list.	
In lots less than one key add 1/2¢ per lb.; 5-lb. boxes add 1/4¢ to list.	

Avery Stamping Co.:	
Standard, in 200 lb. kegs, \$6.00 @ 100 lb. disct.; in 100 lb. kegs, add 10¢ net @ 100 lb; in 5 or 10 lb. boxes, add 50¢ net @ 100 lb; in 1 lb. boxes, add \$1.00 net @ 100 lb.	

Cast Washers—

Over 1/2-inch, barrel lots, per lb. 1 1/2 @ 1 3/4¢	
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Wedges—

Oil Finish.....	1b., 2 1/4 @ 2 3/4¢
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Weights—Hitching—

Covert Mfg. Co.....	25%
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Sash—

Per net ton, Eastern market, \$25.00@—	
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Wheels, Corundum and Emery—

Pike Mfg. Co., Corundum, 65%; Emery.....	75%
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Well—

8-in., \$2.00; 10-in., \$2.50; 12-in., \$3.00; 14-in., \$4.45.	
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Wire and Wire Goods—

Market and Stone Wire in Bundles—	
Bright and Annealed:	
9 and coarser.....	80%
10 to 18.....	80&10%
19 to 26.....	80&10&2 1/2%
27 to 36.....	80&10%

Galvanized:	
9 and coarser.....	75&10%
10 to 16.....	75&10%
17 to 26.....	72 1/2&10%
27 to 36.....	72 1/2%

C

CURRENT METAL PRICES.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

IRON AND STEEL— Bar Iron from store—

Refined Iron:	
1 to 1½ in. round and square.....	¢ 1.90¢
1½ to 4 in. x ½ to 1 in.	¢ 2.10¢
1½ to 4 in. x ½ to 5-16.....	¢ 2.10¢
Rods—¾ and 1-16 round and square.....	¢ 2.10¢
Angles:	
8 in. x ½ in. and larger.....	¢ 2.15¢
8 in. x ¾ in. and 1 in.	¢ 2.15¢
1½ to 2½ in. x ½ in.	¢ 2.15¢
1½ to 2½ in. x ¾ in.	¢ 2.15¢
1½ to 2½ in. x 3-16 in. and thicker.....	¢ 2.15¢
1 to 1½ in. x 3-16 in.	¢ 2.15¢
1 to 1½ in. x ½ in.	¢ 2.15¢
¾ x ½ in.	¢ 2.15¢
¾ x ¾ in.	¢ 2.15¢
¾ x 1 in.	¢ 2.15¢
¾ x 1½ in.	¢ 2.15¢
¾ x 3-16 in.	¢ 2.15¢
Tees:	
1 in.	¢ 2.15¢
1½ in.	¢ 2.15¢
1½ to 2½ in.	¢ 2.15¢
8 in. and larger.....	¢ 2.15¢
Beams.....	¢ 2.15¢
Channels, 3 in. and larger.....	¢ 2.15¢
Bands—1½ to 6 x 3-16 to No. 8.....	¢ 2.15¢
"Burden's Best" Iron, base price.....	¢ 3.15¢
Burden's "H. B. & S." Iron, base price.....	¢ 3.15¢
Norway Bars.....	¢ 3.30¢

Merchant Steel from Store—

Bessemer Machinery.....	per lb. 1.90¢
Toe Calk, Tire and Sleigh Shoe.....	2.50¢ to 3.00¢
Best Cast Steel, base price in small lots.....	7¢

Sheets from Store—

Black	One Pass, C.R.	R. G.
Soft Steel.	Cleaned.	
No. 16.....	¢ 2.80¢	3.00¢
No. 18 to 21.....	¢ 2.85¢	3.00¢
No. 22 and 24.....	¢ 2.95¢	3.10¢
No. 26.....	¢ 3.00¢	3.10¢
No. 28.....	¢ 3.10¢	3.40¢

Russia, Planished, &c.

Genuine Russia, according to assort- ment.....	¢ 12 @ 14½¢
Patent Planished, W. Dewees Wood.....	¢ 10 A, 10¢; B, 9¢ net.

Galvanized.

No. 14 to 16.....	¢ 2.95¢
No. 22 to 24.....	¢ 3.30¢
No. 26.....	¢ 3.51¢
No. 28.....	¢ 3.85¢
No. 20 and lighter 36 inches wide, 36 higher.	

Genuine Iron Sheets—

Galvanized.

No. 22 and 24.....	¢ 5.75¢
No. 26.....	¢ 6.25¢
No. 28.....	¢ 7.25¢

Corrugated Roofing—

2½ in. corrugated.	Painted	Galv.
No. 24.....	¢ 100 sq. ft. \$3.35	4.40
No. 26.....	¢ 100 sq. ft. 2.95	4.00
No. 28.....	¢ 100 sq. ft. 2.60	3.75

Tin Plates—

American Charcoal Plates (per box.)	
"A.A.A." Charcoal:	
IC, 14 x 20.....	\$6.25
IX, 14 x 20.....	7.50

A. Charcoal:

IC, 14 x 20.....	\$5.30
IX, 14 x 20.....	6.40

American Coke Plates—Bessemer-

IC, 14 x 20.....	107¢
IX, 14 x 20.....	5.30

American Terne Plates—

IC, 20 x 28 with an 8 lb. coating.....	\$8.30
IX, 20 x 28 with an 8 lb. coating.....	10.30

Seamless Brass Tubes—

List December 4, 1905.....	Base price 18¢
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Brass Tubes, Iron Pipe Sizes—

List December 4, 1905.....	Base price 18¢
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Copper Tubes—

List December 4, 1905.....	Base price 22¢
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Brazed Brass Tubes—

List August 1, 1908.....	20½¢ per lb.
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High Brass Rods—

List August 1, 1908.....	14½¢ per lb.
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Roll and Sheet Brass—

List August 1, 1908.....	14½¢ per lb.
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Brass Wire—

List August 1, 1908.....	11½¢ per lb.
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Copper Wire—

Base Price, Carload lots mill 14½¢	
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METALS—

Tin—

Straits Pig.....	¢ 31½ @ 32¢
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Copper—

Lake Ingot.....	¢ 14½ @ 15¢
Electrolytic.....	¢ 14½ @ 15¢
Castings.....	¢ 14 @ 14½¢
Sheet Copper Hot Rolled, 16 oz (quantity lots) per lb.....	¢ 17¢
Sheet Copper Cold Rolled, 1¢ per lb advance over Hot Rolled.....	
Sheet Copper Polished 2½ in. wide and under, 1¢ square foot.....	
Sheet Copper Polished over 20 in. wide, 2¢ square foot.....	
Planished Copper, 1¢ per square foot more than Polished.	

Spelter—

Western.....	¢ 63½ @ 67½¢
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Zinc.

No. 9, base, casks... per lb 8¢ Open.....	¢ 8½¢
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Lead.

American Pig.....	¢ 5¼ @ 5½¢
Bar.....	¢ 6¼ @ 6¼¢

Solder.

½ & ¾, guaranteed.....	¢ 20¼ @ 20¾¢
No. 1.....	¢ 17¼ @ 18¼¢
Refined.....	¢ 16 @ 16¼¢
Prices of Solder indicated by private brand vary according to composition.	

Antimony—

Cookson.....	¢ 10¢
Halletts.....	¢ 9¼¢
Other Brands.....	¢ 9¢

Bismuth—

Per. lb.....	\$2.00 @ \$2.25
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Aluminum—

No. 1 Aluminum (guaranteed over 99% pure), in Ingot re-melting.....	¢ 34¢
Rods & Wire.....	Base Price 38¢
Sheets.....	Base Price 34¢

Old Metals.

Dealers' Purchasing Prices Paid in New York	Cents—
Copper, Heavy cut and crucible.....	¢ 11.25 @ 11.50
Copper, Heavy and Wire.....	¢ 10.75 @ 11.00
Copper, Light and Bottoms.....	¢ 9.75 @ 10.00
Brass, Heavy.....	¢ 7.50 @ 7.75
Brass, Light.....	¢ 6.00 @ 6.25
Heavy Machine Composition.....	¢ 10.00 @ 10.25
Clean Brass Turnings.....	¢ 7.00 @ 7.25
Composition Turnings.....	¢ 8.00 @ 8.25
Lead, Heavy.....	¢ 3.75
Lead Tea.....	¢ 3.50
Zinc Scrap.....	¢ 3.50

THE IRON AGE

The oldest paper in the world devoted to the interests of the Hardware, Iron, Machinery and Metal Trades, and a standard authority on all matters relating to those branches of industry.

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